PROMISE®
TECHNOLOGY, INC.

SUPERTRAK
EX16300, EX16350
USER MANUAL

Version 1.0

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Recommendations

In the manual, the appearance of products made by other companies, including, but not limited to software, servers and physical drives, is for the purpose of illustration and explanation only. Promise Technology does not recommend, endorse, prefer or support any product made by another manufacturer.

Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult Promise Technology, Inc. or an experienced radio/TV technician for help.

This device complies with Part 5 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution

Only digital device equipment CERTIFIED CLASS B should be attached to this equipment and that must have shielded cables.

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Chapter 1: Introduction

- About This Manual, below
- Product Overview (page 2)
- WebPAM Management Software (page 3)

Thank you for purchasing one of Promise Technology's SuperTrak EX16300 or EX16350 RAID controllers.

About This Manual

This *User Manual* describes how to setup, use and maintain the SuperTrak RAID controller. It also describes how to use the Web-Based Promise Array Management (WebPAM) RAID management software.

This manual includes a full table of contents, chapter task lists and numerous cross-references to help you find the specific information you are looking for.

Also included are four levels of notices:

Note

A *Note* provides helpful information such as hints or alternative ways of doing a task.

Important

Important calls attention to an essential step or point required to complete a task. Important items include things often missed.

Caution

A *Caution* informs you of possible equipment damage or loss of data and how to avoid them.

Warning

A *Warning* notifies you of probable equipment damage or loss of data, or the possibility of physical injury, and how to avoid them.

Product Overview

SuperTrak EX16300 and EX16350 are Serial ATA RAID controllers. When used with WebPAM software, the SuperTrak RAID Controllers offer a feature-rich, secure and versatile enterprise-wide ATA RAID solution. In addition, the SuperTrak EX Series supports RAID expansion. The resulting RAID environment allows users and administrators to configure, manage, and monitor everything from single logical drives on local systems to logical drive networks residing in offsite locations.

The SuperTrak EX16300 and EX16350 RAID Controller cards support 1.5 Gb/s and 3.0 Gb/s Serial ATA hard drives. At their core, both SuperTrak cards provide advanced RAID management functions: creating logical drives, monitoring them, keeping them online and operating at optimum efficiency. SuperTrak can also perform many other tasks, such as:

- Create logical drives at various RAID levels (0, 1, 5, 6, 10 and 50) and JBOD, depending on the application being used
- Set up a network of SuperTrak RAID servers (all running under different RAID levels) and monitor those servers from any workstation on the network
- Create a series of SuperTrak RAID networks at any number of offsite locations
- Monitor and/or repair SuperTrak RAID logical drives using the Internet from an offsite location—all without compromising the integrity of secure servers

IOP Microprocessor

The SuperTrak EX16300 and EX16350 Controllers have an onboard Intel Input/ Output Processor (IOP) microprocessor, which off loads the parity calculation workload from the main CPU and transfers it to the controller card, boosting the performance of the entire system.

Hot-Swapping

Each SuperTrak EX16300 and EX16350 can support up to 16 Serial ATA physical drives. With either Controller card you can configure the drives as RAID levels 1, 5, 6, 10 or 50. Attached drives can be *hot swapped* when used with any drive enclosure that has a hot-swap-capable backplane.

WebPAM Management Software

The Web-Based Promise Array Management (WebPAM) software offers local and remote management and monitoring of all SuperTrak logical drives that exist anywhere on a network. Browser-based GUI provides email notification of all major events/alarms, memory cache management, drive event logging, logical drive maintenance, rebuild, and access to all components in the RAID configuration (server, controller, logical drives, physical drives, and enclosure). For information on using WebPAM, refer to page 51.

Operating System Support

The SuperBuild utility (see page 31) is independent of the PC's operating system.

On the Host PC where you install the SuperTrak controller and WebPAM, Promise Technology recommends 32-bit or 64-bit versions of:

- Windows 2000
- Windows XP Professional
- Windows 2003
- Red Hat Enterprise Linux 4.0
- SuSE Linux ES 9.0

Browser Support

On the Host PC where you install the SuperTrak controller and WebPAM, you must have one of the following browsers:

- Internet Explorer
- Mozilla
- Firefox
- Netscape Navigator

If you do not have one of the above browsers, install the browser first and make it the default browser. Then install WebPAM.

Chapter 2: Installation

- Packing list, below
- Install the SuperTrak EX16300 Card (page 6)
- Install the SuperTrak EX16350 Card (page 7)
- Installing the Physical Drives (page 8)
- Create a Logical Drive (page 11)
- WebPAM Installation (page 15)

Packing List

When you receive the SuperTrak Serial ATA RAID Controller card, the package should contain the items listed below:

- SuperTrak EX16300 or EX16350 Controller card
- Quick Start Guide
- Four 1.0m (39-inch) SATA fanout cables
- Eight Y power splitter cables
- CD with Drivers, Web-Based Promise RAID Management (WebPAM) software, *SuperTrak EX16300, EX16350 User Manua*l

If any of the items are missing or appear damaged, please contact your dealer or distributor immediately.

Warning

The electronic components on the SuperTrak RAID Controller card are sensitive to damage from Electro-Static Discharge (ESD). Observe appropriate precautions at all times when handling the SuperTrak card or its subassemblies.

Warning

Before installing the adapter into an existing system, backup any important or useful data. Failure to follow this accepted PC practice could result in data loss.

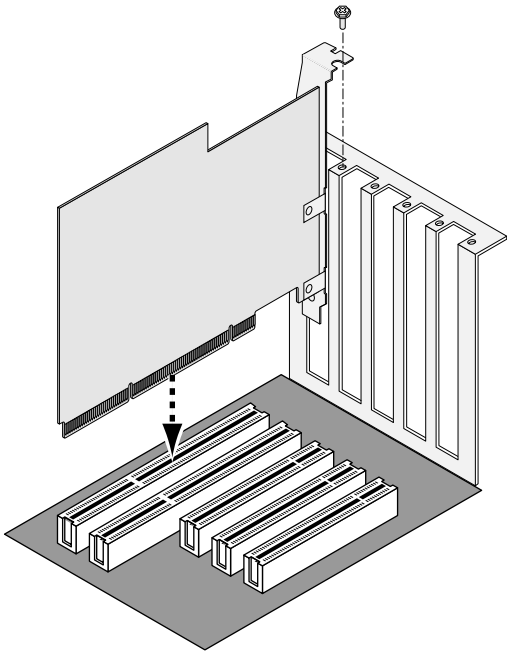
Note

The SuperTrak EX16300 and EX16350 RAID Controller cards are PCI Plug-n-Play (PnP) devices. No changes are necessary in the motherboard CMOS/BIOS Setup for resources or drive types in most applications.

Install the SuperTrak EX16300 Card

The SuperTrak EX16300 card fits into any available 3.3-volt PCI-X slot. You cannot plug the SuperTrak card into a 5-volt PCI slot.

1. Remove the cover of your system.
2. Remove the inside slot cover of an available PCI-X slot on the motherboard.

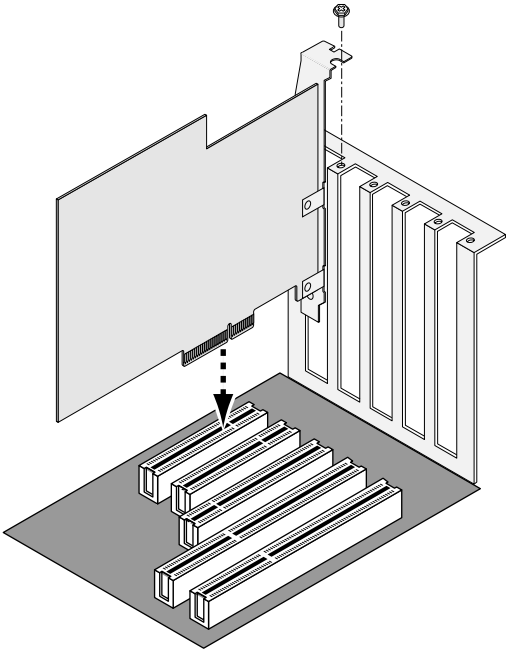


3. Install the SuperTrak card into the open slot (above).
4. Fasten the SuperTrak card bracket to the system case (above).
5. Attach your system case's LED cables to the LED connectors on the SuperTrak card (see page 10).

Install the SuperTrak EX16350 Card

The SuperTrak EX16350 card fits into any available 3.3-volt PCI-Express X8 or X16 slot.

1. Remove the cover of your system.
2. Remove the inside slot cover of an available PCI-Express X8 or X16 slot on the motherboard.



3. Install the SuperTrak card into the open slot (above).
4. Fasten the SuperTrak card bracket to the system case (above).
5. Attach your system case's LED cables to the LED connectors on the SuperTrak card (see page 10).

Installing the Physical Drives

Important

If you wish to include your current bootable Serial ATA drive using the Windows operating system as part of a bootable Mirrored (RAID 1) logical drive on your SuperTrak card, do NOT connect the physical drive to the SuperTrak yet. You MUST install the Windows driver software first onto this drive while it is still attached to your existing physical drive controller.

The SuperTrak EX-Series RAID Controller card supports 1.5-Gb/s and 3.0-Gb/s Serial ATA physical drives. For optimal performance, install physical drives of the same model and capacity. The drives' matched performance allows the logical drive to function better as a single drive.

Level	Number of Drives
RAID 0	1 or more
RAID 1	2 only
RAID 5	3 or more
RAID 6	3 or more
RAID 10	4, 6, 8, 10, 12, 14 or 16
RAID 50	6, 8, 10, 12, 14 or 16
JBOD	1 only

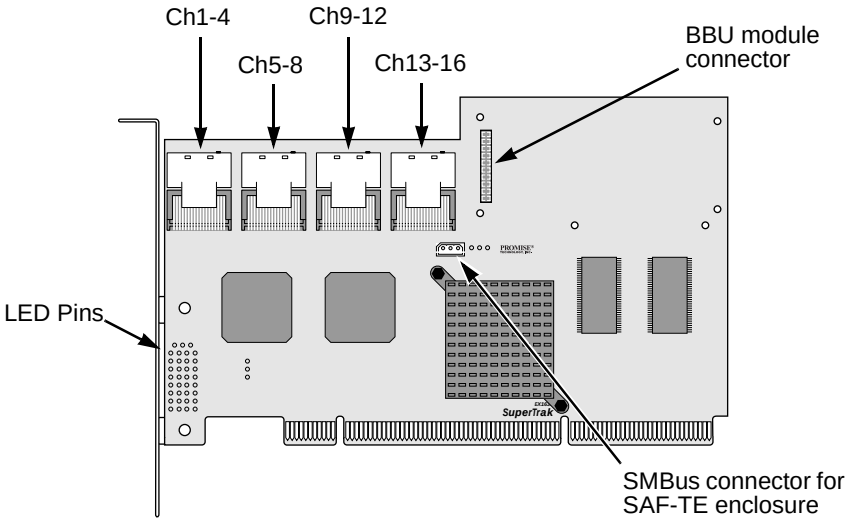
The table above shows the number of drives required for each RAID level.

1. Install the physical drives into the physical drive bays of your system.

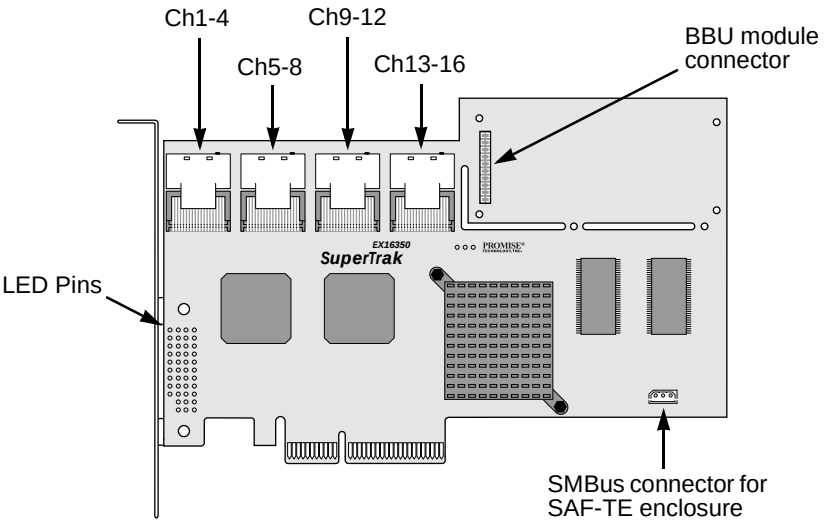
Caution

If you plan to use a removable disk drive enclosure, be sure it meets the SAF-TE standard. Other enclosures are not supported and may result in performance loss or other undesired results.

SuperTrak EX16300



SuperTrak EX16350



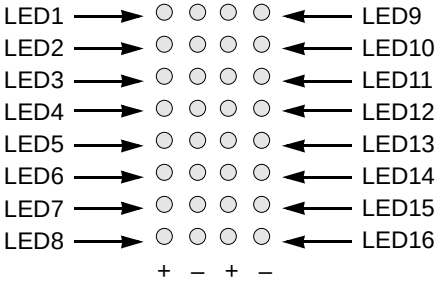
2. Attach one SATA fanout cable to each four-channel connector on the SuperTrak card (above). Then attach the other ends of the fanout cable to the data connectors on the disk drives.

SATA fanout cables typically have numbered ends for the disk drives. The table below indicates which fanout cable end connects to which disk drive.

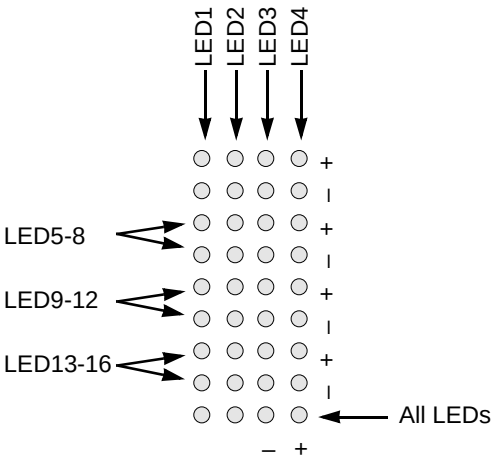
SuperTrak Connector	Fanout Cable End Number	Disk Drive Number		SuperTrak Connector	Fanout Cable End Number	Disk Drive Number
Ch 1-4	1	1		Ch 9-12	1	9
	2	2			2	10
	3	3			3	11
	4	4			4	12
Ch 5-8	1	5		Ch 13-16	1	13
	2	6			2	14
	3	7			3	15
	4	8			4	16

3. Attach the Y-cable power splitters to each of the disk drives.
4. Optional. Attach cables from the LED pins on the SuperTrak card (see the diagrams below) to the activity LEDs in your enclosure.

LED pinouts for SuperTrak EX16300



LED pinouts for SuperTrak EX16350



Create a Logical Drive

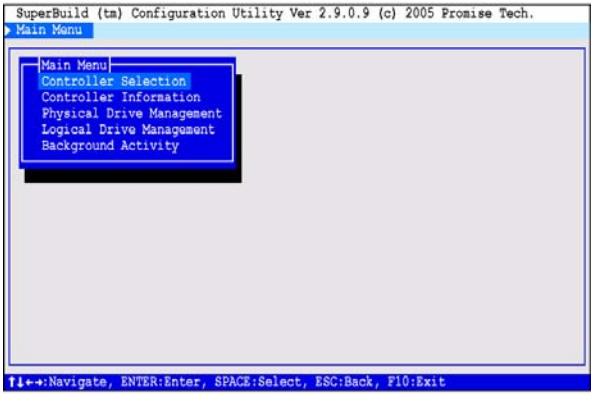
You will now use the onboard SuperBuild BIOS utility to create a logical drive with the attached drives. Even if you plan to use the WebPAM software to manage your logical drive, you can still create your first logical drive using the SuperBuild Utility, as described here.

For an explanation of the logical drive concepts, see “Chapter 6: Technology Background” on page 111 of this manual.

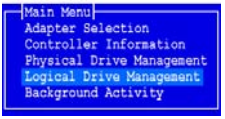
1. Boot your system. If this is the first time you have booted with the SuperTrak card and drives installed, the Promise onboard BIOS will display the following screen.

SuperTrak EX16350/16300/8350/8300(SATAII 300) BIOS Version 2.9.0.12
(c) 2004-2005 Promise Technology, Inc. All rights reserved.
Controller 1:
No Array is defined...
Press <Ctrl> + <S> to enter SuperBuild (tm) Configuration Utility or
Press <Esc> or <Space> to continue

2. Press the Ctrl-S keys to display the SuperBuild Utility Main Menu.

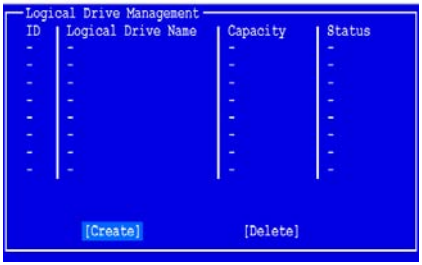


The SuperBuild Utility opens with the Main Menu displays.



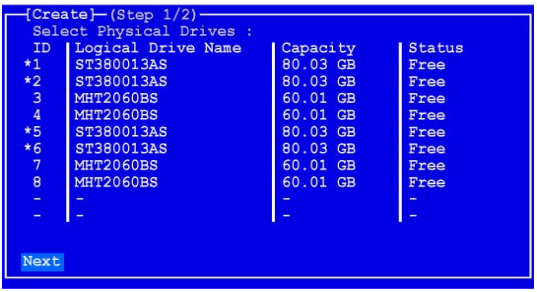
3. Press the arrow keys to highlight Logical Drive Management and press Enter.

   The Logical Drive Management screen displays.



4. Highlight Create and press Enter.

   The Create Step 1/2 screen appears.



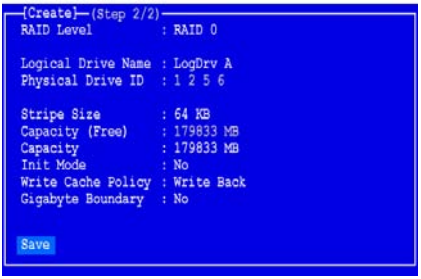
   Use this screen to select the physical drives for your logical drive.

5. Press the arrow keys to highlight a physical drive. Then press the spacebar to select the physical drive.

   An asterisk (*) appears at the left of each selected physical drive.

6. When you have selected all your physical drives, highlight Next and press Enter.

   The Create Logical Drive Step 2/2 screen appears, with default logical drive settings.


[Create]-(Step 2/2)
RAID Level : RAID 0
Logical Drive Name : LogDrv A
Physical Drive ID : 1 2 5 6
Stripe Size : 64 KB
Capacity (Free) : 179833 MB
Capacity : 179833 MB
Init Mode : No
Write Cache Policy : Write Back
Gigabyte Boundary : No
Save

7. To change the RAID Level, highlight RAID Level and press Enter.

In the popup menu, highlight your choice of RAID Level and press Enter.

The available RAID Levels depend on the number of physical drives you selected for this logical drive.

8. Press the arrow keys to highlight Logical Drive Name. Type a name for your logical drive and press Enter.
9. To use less than the full physical drive capacity for this logical drive, highlight Capacity and press Enter.

   Press the Delete or Backspace keys to erase the current capacity. Type the new capacity in MB to allocate to this logical drive.

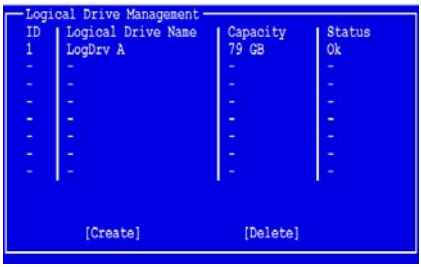
   Later, you can assign the unused capacity to a second logical drive.
10. To change the Stripe Size, highlight Stripe Size and press Enter.

    Highlight your choice of 32, 64 or 128 KB and press Enter.
11. To change the Initialization Mode, highlight Init Mode and press Enter.

    Highlight your choice of No, Quick or Full initialization and press Enter.
12. To change the Write Cache Policy, highlight Write Cache Policy and press Enter.

    Highlight your choice of Write Through or Write Back and press Enter.
13. To change the Gigabyte Boundary feature, highlight Gigabyte Boundary and press Enter.

    Highlight your choice of No or Yes and press Enter.
14. Highlight Save and press Enter.



The Logical Drive Management screen appears with your new logical drive.

At this point you can create additional logical drives, if there is physical drive space available. To create another logical drive, repeat steps 4 though 13 above.

15. Press the F10 key to exit the SuperBuild utility and press Y to confirm and restart the computer.

    Do not press the Ctrl-Alt-Del keys. Do not press the Esc key.

You have successfully created a new RAID logical drive.

WebPAM Installation

Important

Install the SuperTrak software drives for your operating system before installing WebPAM. See “Chapter 3: Installing Software Drivers” on page 23 for instructions.

WebPAM installation software will install two major components:

- WebPAM RAID management software
- Java Runtime Environment (in a private folder)

WebPAM Software

The WebPAM software installs on the PC with the SuperTrak RAID Controller card (the “Host PC”).

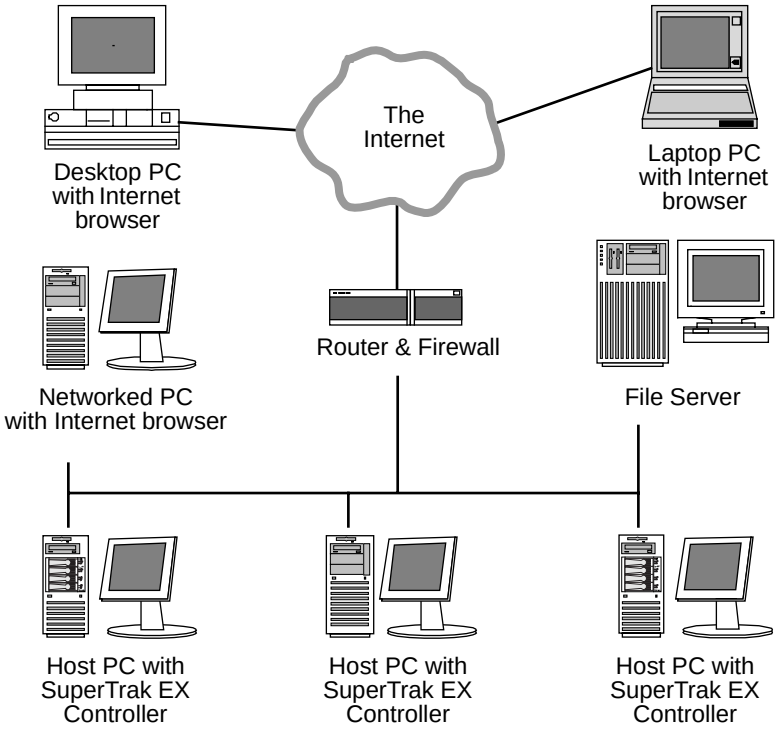

The Internet
Desktop PC with Internet browser
Laptop PC with Internet browser
Router & Firewall
Networked PC with Internet browser
File Server
Host PC with SuperTrak EX Controller
Host PC with SuperTrak EX Controller
Host PC with SuperTrak EX Controller

Figure 16. WebPAM on a network

Java Runtime Environment

The WebPAM installation program installs a private JRE in folder *_jvm* under the same directory where WebPAM is installed. WebPAM uses this private JRE to avoid incompatibility issues with any other JREs that may be present on your system.

Operating System Support

On the Host PC where you install the SuperTrak controller and WebPAM, Promise Technology recommends 32-bit or 64-bit versions of:

- Windows 2000
- Windows XP Professional
- Windows 2003
- Red Hat Enterprise 4.0
- SuSE ES 9.0

The Utility Server supports these operating systems. Choose one of them to take full advantage of all the features of WebPAM.

Browser Support

On the Host PC where you install the SuperTrak controller and WebPAM, you must have one of the following browsers:

- Internet Explorer 6.0
- Mozilla Suite 1.7
- Mozilla Firefox 1.0
- Netscape Navigator 7.1

If you do not have one of the above browsers, install the browser first and make it the default browser. Then install WebPAM.

You must use one of the browsers listed above on your networked PC in order to access WebPAM over the network.

Install WebPAM

Windows

Follow these steps to install WebPAM on your Windows-based PC or Server.

1. Boot up the PC/server and launch Windows.

   If the computer is already running, exit all programs.
2. Insert the software CD into your CD-ROM drive.

3. Double-click on the Install CD's icon to open it.
4. Double-click on the Installer icon to launch it (right).

   The first WebPAM installation dialog box appears.

5. Follow the prompts in the installation dialog box.

Linux

Follow these steps to install WebPAM on your Linux-based PC or Server.

1. Boot up the PC/server and launch the Linux GUI.

   If the computer is already running, exit all programs.

2. Insert the software CD into your CD-ROM drive.
3. In the CD window, double-click on the **webpam...bin** icon to begin installation (right).

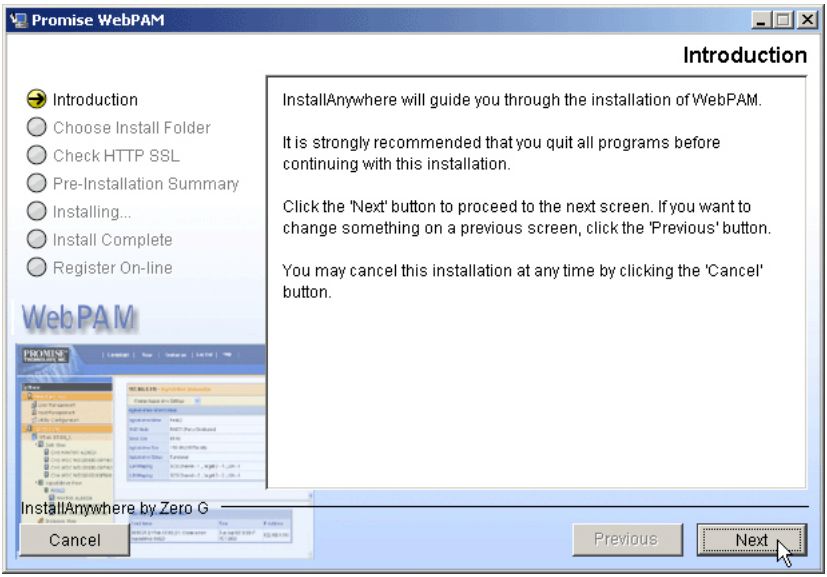
4. When the Run or Display? dialog box appears, click *Run in Terminal*.

   After several moments, the Terminal window closes and the first WebPAM installation dialog box appears.

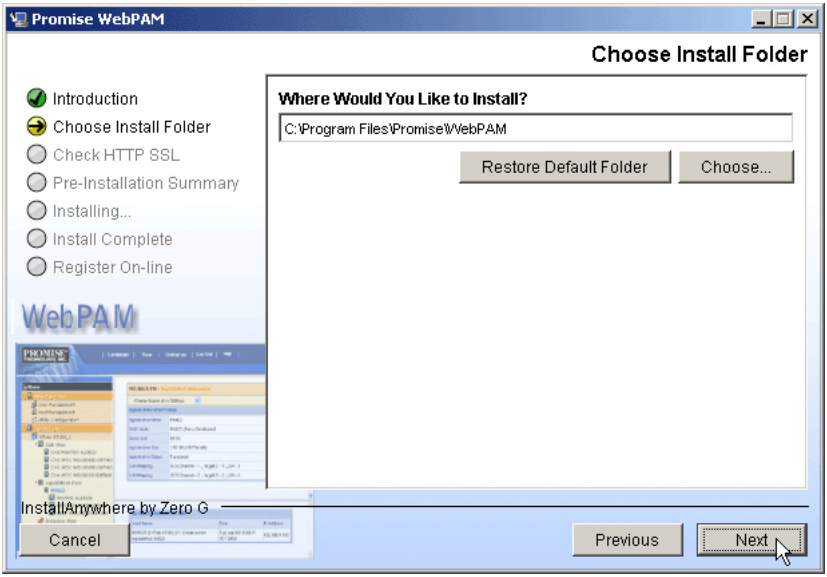
5. Follow the prompts in the installation dialog box.

WebPAM Installation for Windows and Linux, continued

The first WebPAM installation dialog box appears, as shown below.


Promise WebPAM
Introduction
Introduction
Choose Install Folder
Check HTTP SSL
Pre-Installation Summary
Installing...
Install Complete
Register On-line
WebPAM
InstallAnywhere will guide you through the installation of WebPAM.
It is strongly recommended that you quit all programs before continuing with this installation.
Click the 'Next' button to proceed to the next screen. If you want to change something on a previous screen, click the 'Previous' button.
You may cancel this installation at any time by clicking the 'Cancel' button.
InstallAnywhere by Zero G
Cancel
Previous
Next

6. When the Introduction screen appears (above), click the **Next** button.



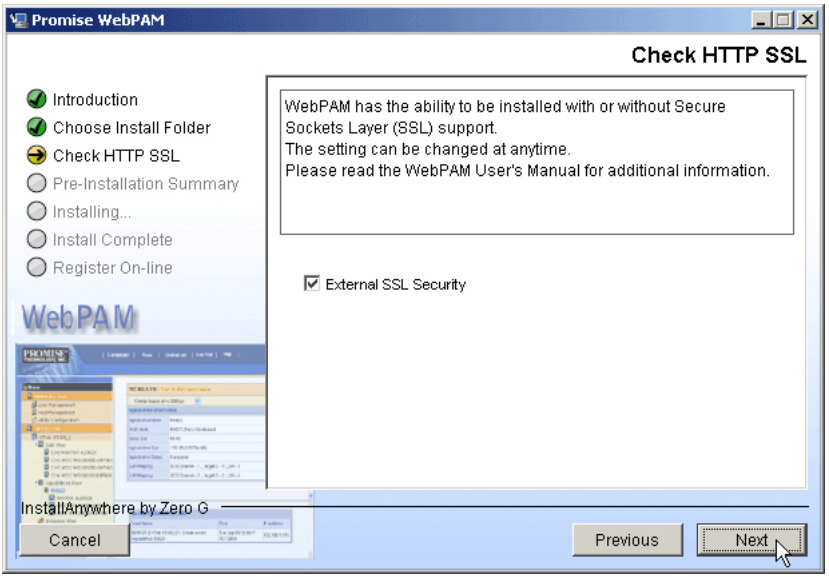
7. When the Choose Install Folder screen appears (above), make your selection of a folder for the WebPAM applications you are installing.

   For example, the Windows default folder is **C:\Program Files\Promise\WebPAM**. If you want a different folder, type its location or click the **Browse** button and select a new location.

   If you change your mind and want the default location, click on the **Back** button, then the **Next** button.

   Click the **Next** button when you are finished

.



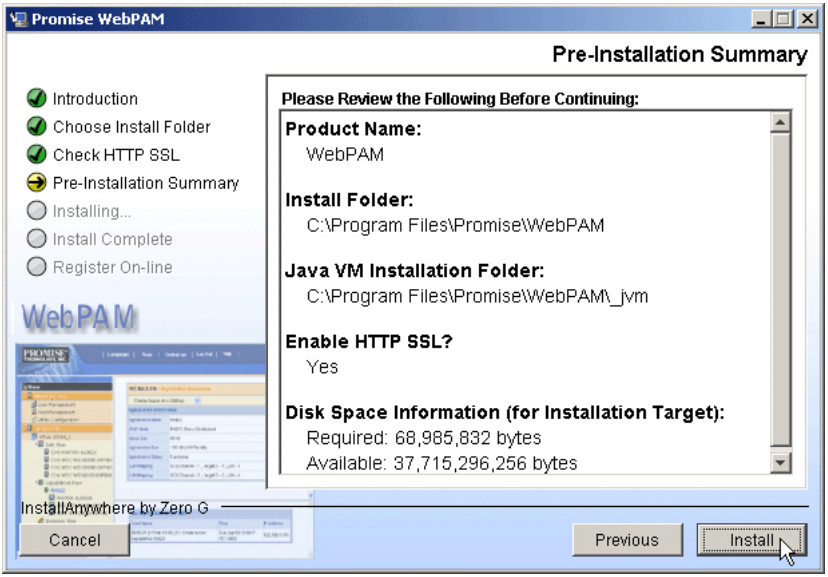
8. When the Check HTTP SSL screen appears (above), you can check External Security. An explanation follows.

   External SSL Security – Applies security to all connections involving the Internet or outside your company firewall.

   Security options are invisible to authorized users.

   Promise Technology provides a default certificate for the server as well as for internal data communication. However, in some cases it is always better to install and verify your own certificate for the webserver. And, and if possible, verify certificate by certificate authority like Verisign or Thwate. See your MIS Administrator for guidance.

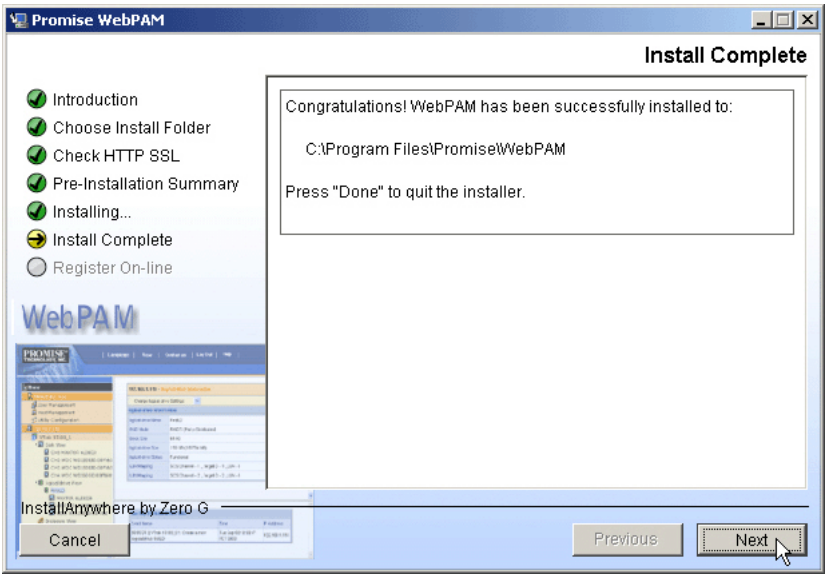
   Click the **Next** button when you have made your choice.



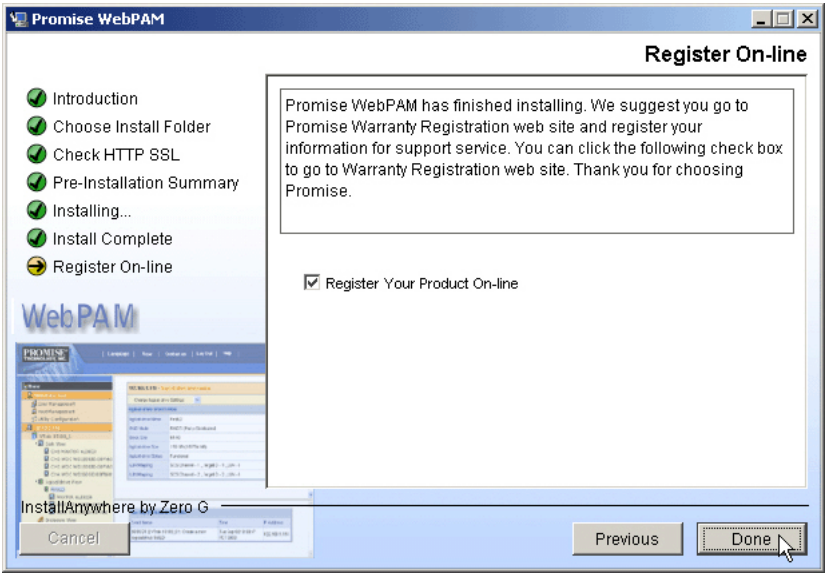
9. When the Pre-Installation Summary screen appears (above), review your choices.

   To make changes, click the **Previous** button.

   To continue, click the **Install** button.



When the Install Complete screen appears (above), the installation process is finished. Click the **Next** button.


Promise WebPAM
Register On-line
Introduction
Choose Install Folder
Check HTTP SSL
Pre-Installation Summary
Installing...
Install Complete
Register On-line
Promise WebPAM has finished installing. We suggest you go to Promise Warranty Registration web site and register your information for support service. You can click the following check box to go to Warranty Registration web site. Thank you for choosing Promise.
Register Your Product On-line
WebPAM
InstallAnywhere by Zero G
Cancel
Previous
Done

10. When the Register On-line screen appears (above), the installation process is finished. Click the **Done** button to go to the Promise Registration website.

Important

Registration of your SuperTrak and WebPAM provides useful information that helps Promise Technology, Inc. to offer better products and support. Please take a few minutes to register. Thanks!

This completes the WebPAM installation. Go to “Chapter 5: WebPAM” on page 51 for information about using WebPAM.

Chapter 3: Installing Software Drivers

Following are driver installation procedures for the SuperTrak EX16300 and EX16350 RAID Controller cards. Download the latest drivers from the Promise Technology website at www.promise.com/support.

Important

Promise provides 32-bit and 64-bit versions of it drivers. Be sure you select the appropriate driver for your system.

Procedure **Page Number**

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Windows Server 2003

Install Driver During New OS Installation

1. Start the installation: Boot from the CD-ROM. Press F6 after the message "Press F6 if you need to install third party SCSI or RAID driver" appears.
2. When the Windows Setup window is generated, press S to specify an Additional Device(s)
3. Insert the Promise Technology driver diskette into drive A: and press Enter.
4. Choose *Promise SuperTrak EX8350/EX16350/EX8300/EX16300 (tm) Controller* from the list that appears on screen. Specify the 32-bit or 64-bit driver. Then press the Enter.
5. Press S to use the driver on the floppy disk and then press Enter to continue with installation.
6. The Windows 2003 Setup screen will appear again saying "Setup will load support for the following mass storage devices:" The list will include *Promise SuperTrak EX8350/EX16350/EX8300/EX16300 (tm) Controller*.

   Note: If you need to specify any additional devices to be installed, do so at this time. Once all devices are specified, continue to the next step.
7. From the Windows Setup screen, press the Enter. Setup will now load all device files and then continue the Windows installation.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Install Driver in an Existing System

Important

If you plan to move the boot drive containing the existing Windows Server 2003 operating system to the SuperTrak card, you MUST load the SuperTrak driver to the boot drive while it is still attached to your existing hard drive controller.

Do not attach the boot drive to the SuperTrak card before completing this step.

After installing the SuperTrak card and rebooting your system, Windows setup will show a Found New Hardware dialog box.

1. Insert the Promise SuperTrak Driver diskette in the A: drive.
2. When the New Hardware Wizard appears, select *Install from a list or specific location (advanced)* and click *Next*.

3. Under Please choose your search and installation options, select *Don't search. I will choose the driver to install* and click *Next.*
4. Under Select the device driver you want to install, click *Have Disk...*
5. Under Install from Disk:
   - For a 32-bit OS, type **A:\i386\st8350.inf** and click *OK.*
   - For a 64-bit OS, type **A:\amd64\st8350.inf** and click *OK.*
6. Under Select the device driver you want to install, click *Next*.
7. If a warning about Windows Logo testing appears, click *Continue Anyway*.
8. Under Completing the Found New Hardware Wizard, click *Finish*.
9. If the New Hardware Wizard appears again, close it.
10. Click *Yes* to restart your PC.
11. Remove the Promise SuperTrak Driver diskette.
12. When the Found New Hardware Wizard appears a second time, select *Install the Software Automatically (Recommended)* and click *Next*.
13. If a warning about Windows Logo testing appears, click *Continue Anyway*.
14. Under Completing the Found New Hardware Wizard, click *Finish*.

Note: Check the readme file, included with the driver files, for instructions on installing the RAID Console.

Confirm Installation

1. From the Windows Desktop, open the Control Panel from My Computer.
2. Click on Performance and maintenance.
3. Click on the System icon.
4. Choose the Hardware tab, and then click the Device Manager button.
5. Click the + in front of SCSI controllers. *Promise SuperTrak EX8350/ EX16350/EX8300/EX16300 (tm) Controller* should appear.

Windows XP

Install Driver During New OS Installation

1. Start the installation: Boot from the CD-ROM. Press F6 after the message "Press F6 if you need to install third party SCSI or RAID driver" appears.
2. When the Windows Setup window is generated, press S to specify an Additional Device(s)
3. Insert the Promise Technology driver diskette into drive A: and press Enter.

4. Choose *Promise SuperTrak EX8350/EX16350/EX8300/EX16300 (tm) Controller* from the list that appears on screen. Specify the 32-bit or 64-bit driver. Then press the Enter.
5. Press S to use the driver on the floppy disk and then press Enter to continue with installation.
6. The Windows XP Setup screen will appear again saying “Setup will load support for the following mass storage devices:” The list will include *SuperTrak EX8350/EX16350/EX8300/EX16300 (tm) Controller*.

   Note: If you need to specify any additional devices to be installed, do so at this time. Once all devices are specified, continue to the next step.
7. From the Windows Setup screen, press the Enter. Setup will now load all device files and then continue the Windows XP installation.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Install Driver in an Existing System

Important

If you plan to move the boot drive containing the existing Windows XP operating system to the SuperTrak card, you MUST load the SuperTrak driver to the boot drive while it is still attached to your existing hard drive controller.

Do not attach the boot drive to the SuperTrak card before completing this step.

After installing the SuperTrak card and rebooting your system, Windows setup will show a Found New Hardware dialog box.

1. Insert the Promise SuperTrak Driver diskette in the A: drive.
2. When the New Hardware Wizard appears, select *Install from a list or specific location (advanced)* and click *Next.*
3. Under Please choose your search and installation options, select *Don’t search. I will choose the driver to install* and click *Next.*
4. Under Select the device driver you want to install, click *Have Disk...*
5. Under Install from Disk:
   - For a 32-bit OS, type **A:\i386\st8350.inf** and click *OK.*
   - For a 64-bit OS, type **A:\amd64\st8350.inf** and click *OK.*
6. Under Select the device driver you want to install, click *Next.*
7. If a warning about Windows Logo testing appears, click *Continue Anyway*.
8. Under Completing the New Hardware Wizard, click *Finish.*

9. If the New Hardware Wizard appears again, close it.
10. Click *Yes* to restart your PC.
11. Remove the Promise SuperTrak Driver diskette.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Confirm Installation

1. From the Windows Desktop, open the Control Panel from My Computer.
2. Click on Performance and maintenance.
3. Click on the System icon.
4. Choose the Hardware tab, and then click the Device Manager button.
5. Click the + in front of SCSI controllers. *Promise SuperTrak EX8350/ EX16350/EX8300/EX16300 (tm) Controller* should appear.

Windows 2000

Install Driver During New OS Installation

1. Start the installation: Boot from the CD-ROM. Press F6 after the message “Press F6 if you need to install third party SCSI or RAID driver” appears.
2. When the Windows Setup window is generated, press S to specify an Additional Device(s)
3. Insert the Promise Technology driver diskette into drive A: and press Enter.
4. Choose *Promise SuperTrak EX8350/EX16350/EX8300/EX16300 (tm) Controller* from the list that appears on screen, and then press the Enter.
5. The Windows Setup screen will appear again saying “Setup will load support for the following mass storage devices:” The list will include *Promise SuperTrak EX8350/EX16350/EX8300/EX16300 (tm) Controller*.

   Note: If you need to specify any additional devices to be installed, do so at this time. Once all devices are specified, continue to the next step.
6. From the Windows Setup screen, press the Enter. Setup will now load all device files and then continue the Windows installation.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Install Driver in an Existing System

Important

If you plan to move the boot drive containing the existing Windows 2000 operating system to the SuperTrak card, you MUST load the SuperTrak driver to the boot drive while it is still attached to your existing hard drive controller.

Do not attach the boot drive to the SuperTrak card before completing this step.

After installing the SuperTrak card and rebooting your system, Windows setup will show a Found New Hardware dialog box.

1. When the New Hardware Wizard appears, click *Next.*
2. Insert the Promise SuperTrak Driver diskette in the A: drive.
3. Under Install Hardware Device Drivers, select *Search for a suitable driver...* and click *Next*.
4. Under Locate Driver Files, uncheck *Floppy physical drives and CD-ROM drives*. Check *Specify a Location* and click *Next.*
5. Under Insert the manufacturer's installation disk, type **A:** and click *OK*.
6. Under Driver Files Search Results:
   - For a 32-bit OS, when *a:\i386\st8350.inf* appears, click *Next.*
   - For a 64-bit OS, when *a:\amd64\st8350.inf* appears, click *Next.*
7. If a Digital Signature Notice appears, click *Yes.*
8. Under Completing the New Hardware Wizard, click *Finish.*
9. Click *Yes* to restart your PC.
10. Remove the Promise SuperTrak Driver diskette.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Confirm Installation

1. From the Windows Desktop, open the Control Panel from My Computer.
2. Click on the System icon.
3. Choose the Hardware tab, and then click the Device Manager button.
4. Click the + in front of SCSI controllers. *Promise SuperTrak EX8350/ EX16350/EX8300/EX16300 (tm) Controller* should appear.

Red Hat Linux EL 4.0

Install Driver During New OS Installation

1. Insert the Red Hat Installation CD into your CD-ROM drive.
2. At the *Welcome to Red Hat Linux...* installation screen, a prompt labeled boot: will appear at the bottom of the screen. Type **linux dd** and press Enter.
3. When the Installer asks, *Do you have a driver disk?* click *Yes*.
4. When the Installer asks for a Driver Disk Source, highlight *fd0* and click OK.
5. At the *Insert your driver disk and press OK to continue*, insert the driver diskette into the floppy drive and click OK.
6. When the Installer asks for more driver disks, respond appropriately. Continue with the installation normally.

Install Driver in an Existing System

1. Insert SuperTrak Driver Diskette into the floppy drive.
2. Log in as *root*.
3. Run **mount -r /dev/fd0 /media/floppy**.
4. Run **cd /media/floppy**.
5. Run **sh ./install**.
6. When the Installer asks, *You are installing a driver on an existing OS. Is it true (y/n)?*, type **Y** and press Enter.
7. Run **cd; umount /media/floppy**.
8. Remove the SuperTrak Driver Diskette.
9. Run **reboot** to restart the system.

SuSE Linux ES 9.0

Install Driver During New OS Installation

1. Insert the SuSE Installation CD into your CD-ROM drive.
2. When the boot: picture prompts for an installation option, choose *Installation*.
3. Press the F6 key and insert the SuperTrak driver diskette into the floppy drive.
4. In the Driver Update Medium selection box, choose *fd0* and click OK.
5. When the Driver Update Medium selection box appears again, click Back to continue.
6. Finish the installation normally.

Install Driver in an Existing System

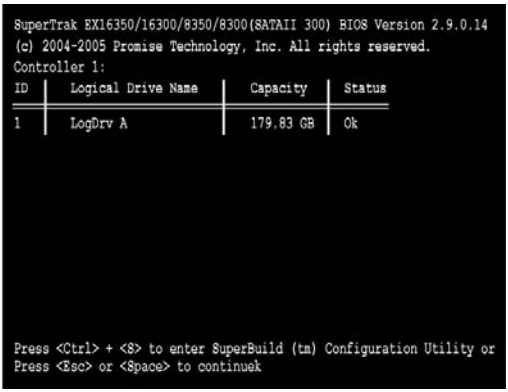
1. Insert SuperTrak Driver Diskette into the floppy drive.
2. Log in as *root*.
3. Run **mount /dev/fd0 /media/floppy**.
4. Run **cd /media/floppy**.
5. Run **./install**.
6. Run **cd; umount /media/floppy**.
7. Remove the SuperTrak Driver Diskette.
8. Run **reboot** to restart the system.

Chapter 4: SuperBuild™ Utility

- SuperTrak BIOS (below)
- Main Menu (page 32)
- Controller Selection (page 33)
- Controller Information (page 34)
- Physical Drive Management (page 34)
- Physical Drive Information (page 35)
- Display Logical Drives (page 36)
- Create a Logical Drive (page 37)
- Delete Logical Drive (page 39)
- Rebuild a Logical Drive (page 40)
- Initialize a Logical Drive (page 42)
- Synchronize a Logical Drive (page 44)
- Migrate a Logical Drive (page 46)
- Logical Drive Problems (page 48)

SuperTrak BIOS

This section explains the information that you can obtain from the SuperTrak BIOS.



When the SuperTrak BIOS loads during bootup, it displays pertinent information about the RAID logical drives that it finds. At this point, press Ctrl-S to enter the SuperBuild Configuration Utility.

The SuperTrak BIOS screen displays the following information:

Controller – Up to two SuperTrak controllers are supported, shown as Controller 1 and Controller 2.

ID – An identification number assigned to each logical drive by the BIOS.

Logical Drive Name – The user-assigned name of the logical drive

Capacity – The data capacity of the logical drive in GB (Gigabytes).

Status – Shows one of four logical drive conditions:

Ok – The logical drive is fully operational, and no problems are present.

Degrade – For RAID 6, the logical drive contains a failed physical drive. If there is a hot spare drive, the logical drive will rebuild automatically. You must identify and replace the failed physical drive.

Critical – The logical drive is operational, but has lost its fault tolerance. For RAID 1, 5, 10 and 50, the logical drive contains a failed physical drive. RAID level 6 is critical when to physical drives have failed. If there is a hot spare drive, the logical drive will rebuild automatically. You must identify and replace the failed physical drive.

Offline – The logical drive is no longer operational and the SuperBuild utility cannot rebuild it. You must identify and replace the failed drive(s). Then you can create a new logical drive and copy your data to it from the last tape backup or other device.

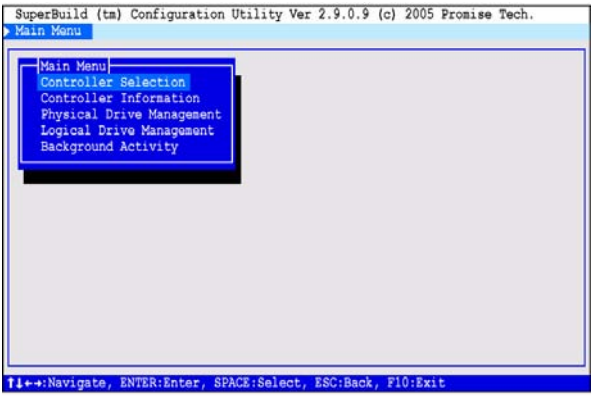
For RAID 1, 5, 10 and 50, at least two or more physical drives in the logical drive have failed.

For RAID 6, at least three or more physical drives in the logical drive have failed.

For a RAID 0 or JBOD logical drive, at least one physical drive has failed.

Main Menu

When the SuperTrak BIOS displays on your computer screen, press Ctrl-S to launch the SuperBuild utility and display the Main Menu.



The Main Menu (above) has five options:

- Controller Selection – Select which of two SuperTrak controllers you want to access
- Controller Information – Memory type and size, Firmware and BIOS version numbers, and address information that may be helpful for diagnostic purposes
- Physical Drive Management – A list of physical drives attached to the SuperTrak controller, their ID (channel) numbers, model numbers, capacity and status
- Logical Drive Management – A list of logical drives plus create and delete logical drive functions
- Background Activity – A list of logical drives, any current background activity, logical drive status and percentage of activity completed. Background activities include: Rebuild, Initialize, Synchronize, Migrate and Pause/ Resume

Controller Selection

The SuperBuild Configuration utility supports up to two SuperTrak RAID Controller cards in the same Host PC. Controller selection enables you to select which of the two SuperTrak controllers is accessed by the utility.

If you have only one SuperTrak card installed, it is Controller 1. If you have two SuperTrak cards, use the following procedure to select one:

1. In the Main Menu, highlight *Controller Selection* and press Enter.
2. Highlight *Controller 1* or *Controller 2* and press Enter.

   The selected controller (SuperTrak card) will display in the SuperBuild utility.

Controller Information

The SuperBuild utility displays information about the selected SuperTrak controller.

1. In the Main Menu, highlight *Controller Information* and press Enter.

   The information includes:

   Vendor – Promise Technology, Inc.

   Model – SuperTrak EX16300 or EX16350

   Memory Type – ECC (Error Correcting Code, checks for errors and corrects them automatically)

   Memory Size – 256 MB

   Firmware Version – The version number of the firmware currently installed on the SuperTrak controller. Firmware is upgradable. Contact Promise Technical Support for more information. See page 133.

   BIOS Version – The version number of the BIOS currently installed on the SuperTrak controller. BIOS is upgradable. Contact Promise Technical Support for more information. See page 133.

   PCI Func Address – The functional address of the SuperTrak card in the Host PC. Used for advanced diagnostics

   PCI Base Address – The base address of the SuperTrak card in the Host PC. Used for advanced diagnostics

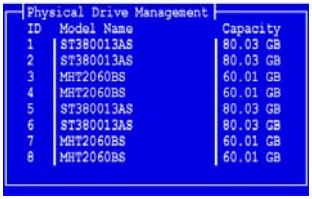
   Controller Speed – SATAII 3Gb/s

2. Press the Esc key to return to the Main Menu.

Physical Drive Management

The SuperBuild utility displays information about the physical (disk) drives attached to the SuperTrak controller.

1. In the Main Menu, highlight *Physical Drive Management* and press Enter.



The information includes:

ID – The channel number of the SuperTrak controller to which the physical drive is attached

Mode Name – The physical drive manufacturer's model name for the drive

Capacity – Data capacity of the physical drive in GB

2. Press the Esc key to return to the Main Menu.

Physical Drive Information

The SuperBuild utility displays information about the physical (disk) drives attached to the SuperTrak controller.

1. In the Main Menu, highlight *Physical Drive Management* and press Enter.
2. Highlight the physical drive you want to see and press Enter.

Physical Drive Information
Physical Drive ID : 1
Model Number : ST380013AS
Serial Number : 5JV981T9
Firmware Version : 3.18
DMA Mode : UDMA 5
Capacity : 80.03 GB
Extent Status : 1-Free/79.96 GB

The information includes:

Physical Drive ID – The channel number of the SuperTrak controller to which the physical drive is attached

Model Number – The physical drive manufacturer's model name or number

Serial Number – The serial number of this physical drive

Firmware Version – The version number of the firmware on this physical drive

DMA Mode – The UDMA mode in which this physical drive currently operates

Capacity – The data capacity of the physical drive in GB

Extent Status – An extent is Free (unused) or Assigned (to a logical drive) and has a specific size in GB. There can be one or multiple extents on a physical drive. Extents are made when you create a logical drive. See "Create a Logical Drive" on page 37.

3. Press the Esc key twice to return to the Main Menu.

Logical Drive Management

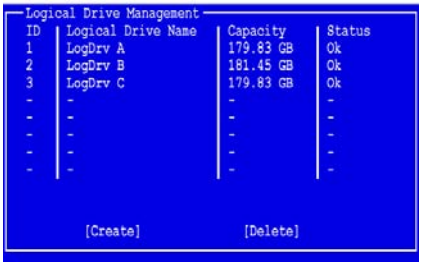
The SuperBuild utility displays information about the logical drives on the SuperTrak controller and enables you to create and delete logical drives.

For an explanation of the logical drive concepts, see “Chapter 6: Technology Background” on page 111 of this manual.

Display Logical Drives

1. In the Main Menu, highlight *Logical Drive Management* and press Enter.

   The Logical Drive Management screen displays.



   The information includes:

   ID – The consecutive number of the logical drive in the order it was created, beginning with 1

   Logical Drive Name – The user-assigned name for the logical drive

   Capacity – Data capacity of the logical drive in GB

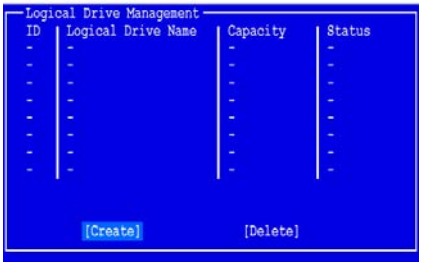
   Status – Shows one of seven logical drive conditions: Ok, Critical, Offline, Initial, Migration, Synchron and Rebuild. See page 31 for definitions

2. Press the Esc key to return to the Main Menu.

Create a Logical Drive

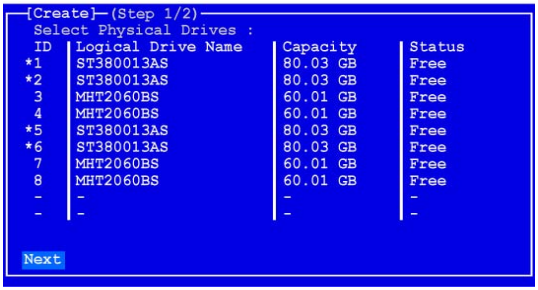
1. In the Main Menu, highlight *Logical Drive Management* and press Enter.

   The Logical Drive Management screen displays.



2. Highlight *Create* and press Enter.

   The Create Step 1/2 screen appears.



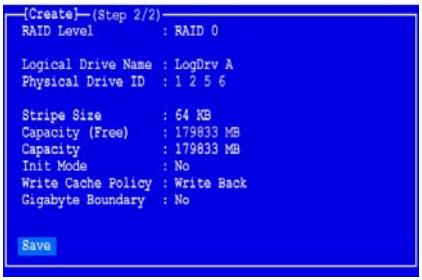
   Use this screen to select the physical drives for your logical drive.

3. Press the arrow keys to highlight a physical drive. Then press the spacebar to select the physical drive.

   An asterisk (*) appears at the left of each selected physical drive.

   When you have selected all your physical drives, highlight *Next* and press Enter.

The Create Step 2/2 screen appears, with default logical drive settings.


[Create]—(Step 2/2)
RAID Level : RAID 0
Logical Drive Name : LogDrv A
Physical Drive ID : 1 2 5 6
Stripe Size : 64 KB
Capacity (Free) : 179833 MB
Capacity : 179833 MB
Init Mode : No
Write Cache Policy : Write Back
Gigabyte Boundary : No
Save

4. To change the RAID Level, highlight *RAID Level* and press Enter.

   In the popup menu, highlight your choice of RAID Level and press Enter.

   The available RAID Levels depend on the number of physical drives you selected for this logical drive.

5. Press the arrow keys to highlight *Logical Drive Name*. Type a name for your logical drive and press Enter.

6. To use less than the full physical drive capacity for this logical drive, highlight *Capacity* and press Enter.

   Press the Delete or Backspace keys to erase the current capacity. Type the new capacity in MB to allocate to this logical drive.

   Later, you can assign the unused capacity to a second logical drive.

7. To change the Stripe Size, highlight *Stripe Size* and press Enter.

   Highlight your choice of 32, 64 or 128 KB and press Enter.

8. To change the Initialization Mode, highlight *Init Mode* and press Enter.

   Highlight your choice of No, Quick or Full initialization and press Enter.

   Full Initialization is recommended.

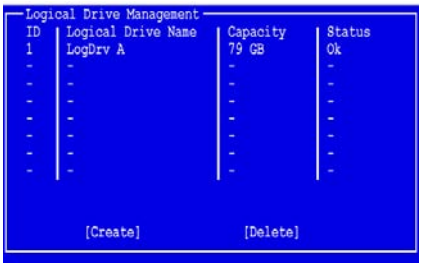
9. To change the Write Cache Policy, highlight *Write Cache Policy* and press Enter.

   Highlight your choice of *Write Through* or *Write Back* and press Enter.

10. To change the Gigabyte Boundary feature, highlight *Gigabyte Boundary* and press Enter.

    Highlight your choice of *No* or *Yes* and press Enter.

11. Highlight *Save* and press Enter.



The Logical Drive Management screen appears with your new logical drive.

At this point you can create additional logical drives, if there is physical drive space available. To create another logical drive, repeat steps 2 though 11 above.

12. Press the F10 key to exit the SuperBuild utility and press Y to confirm and restart the computer.

Do not press the Ctrl-Alt-Del keys. Do not press the Esc key.

Important

You must partition and format your new logical drive before you can use it. Use the same method of partitioning and formatting a logical drive as you would any other fixed disk added to your computer system.

Delete Logical Drive

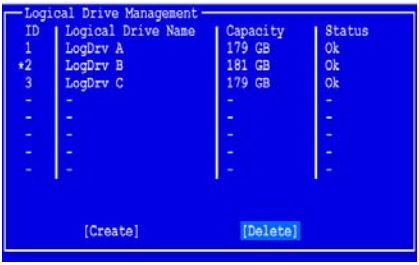
Warning

When you delete a logical drive, you delete all data on the logical drive. Be sure to backup any important data before you delete a logical drive!

To delete a logical drive:

1. In the Main Menu, highlight *Logical Drive Management* and press Enter.

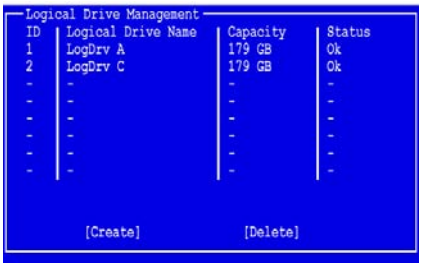
The Logical Drive Management screen displays.



2. Highlight the logical drive you wish to delete and press the spacebar to mark it.

   An asterisk (*) appears at the left of the selected logical drive.

3. Highlight *Delete* and press Enter.
4. Press Y to confirm logical drive deletion.



The selected logical drive is removed from the list.

Background Activity

The SuperBuild utility provides maintenance, repair and enhancement functions for your logical drives, including Rebuild, Initialization, Synchronization and Migration.

Rebuild a Logical Drive

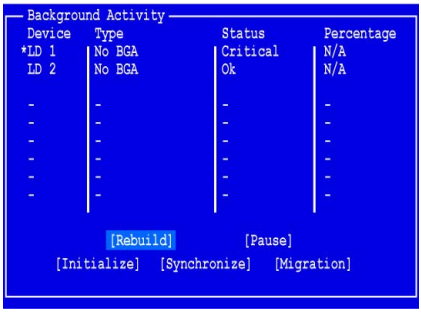
Fault-tolerant (RAID 1, 5, 10 and 50) logical drives go *Critical* when a physical drive fails. A RAID 6 logical drive goes *Degraded* when one physical drive fails and *Critical* when two physical drives fail.

The Rebuild operation enables you to replace the failed physical drive in your logical drive. You must have a Free physical drive of adequate size on your Host PC system in order to do a Rebuild.

To Rebuild a logical drive:

1. In the Main Menu, highlight Background Activity and press Enter.

   The Background Activity screen displays.

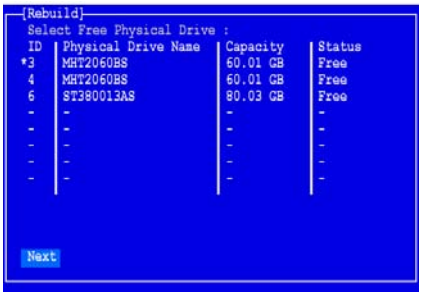


2. Highlight the critical logical drive and press the spacebar to mark it.

   An asterisk (*) appears at the left of the selected logical drive.

3. Highlight *Rebuild* and press Enter.

   The Rebuild screen appears.



4. Highlight the Free physical (disk) drive you want to use for the rebuild and press the spacebar to mark it.

   An asterisk (*) appears at the left of the selected physical drive.

5. Highlight *Next* and press Enter.

6. Press Y to confirm the Rebuild operation on the selected logical drive.

   The Rebuild begins immediately. The length of time required depends on the size of the logical drive and other operations.

Pause

To pause the Rebuild:

1. In the Main Menu, highlight *Background Activity* and press Enter.
   The Background Activity screen displays.
2. Highlight the rebuilding logical drive and press the spacebar to mark it.
   An asterisk (*) appears at the left of the selected logical drive.
3. Highlight *Pause* and press Enter.
4. Press Y to confirm the pause.
   The Status of the rebuilding logical drive changes to Paused.

Resume

To resume the Rebuild:

1. In the Main Menu, highlight *Background Activity* and press Enter.
   The Background Activity screen displays.
2. Highlight *Rebuild* and press the spacebar to mark it.
   An asterisk (*) appears at the left of the selected logical drive.
3. Highlight *Rebuild* and press Enter.
4. Press Y to confirm the Rebuild.
   The Status of the rebuilding logical drive changes to Running.

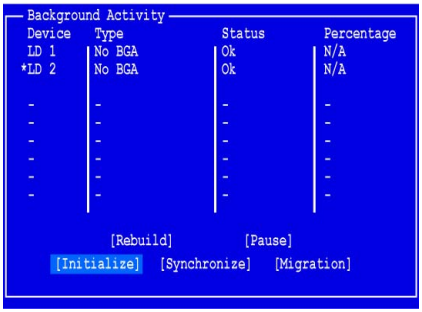
Initialize a Logical Drive

When you create a logical drive and select Full Initialization, the RAID controller writes zeros to the data and parity portions of the physical (disk) drives. This action effectively erases all information that was on the physical drives.

When you initialize an existing logical drive, you perform a synchronization and fix operation. See “Synchronize a Logical Drive” on page 44. This action is non-destructive, that is, it does not erase any data or parity.

To initialize a logical drive:

1. In the Main Menu, highlight *Background Activity* and press Enter.
   The Background Activity screen displays.



2. Highlight the logical drive you want to initialize and press the spacebar to mark it.

   An asterisk (*) appears at the left of the selected logical drive.

3. Highlight *Initialize* and press Enter.

   The Initialize screen appears.

   Full is the only option.

4. Highlight *Next* and press Enter.

5. Press Y to confirm the Initialization on the selected logical drive.

   The Initialization begins immediately. The length of time required depends on the size of the logical drive and other operations.

Pause

To pause the Initialization:

1. In the Main Menu, highlight *Background Activity* and press Enter.
   The Background Activity screen displays.
2. Highlight the initializing logical drive and press the spacebar to mark it.
   An asterisk (*) appears at the left of the selected logical drive.
3. Highlight *Pause* and press Enter.
4. Press Y to confirm the pause.
   The Status of the initializing logical drive changes to Paused.

Resume

To resume the Initialization:

1. In the Main Menu, highlight *Background Activity* and press Enter.
   The Background Activity screen displays.
2. Highlight the initializing logical drive and press the spacebar to mark it.
   An asterisk (*) appears at the left of the selected logical drive.
3. Highlight *Initialize* and press Enter.
4. Press Y to confirm the Initialization.
   The Status of the initializing logical drive changes to Running.

Synchronize a Logical Drive

Synchronization refers to an automated process of checking and correcting data and parity. Unlike a Rebuild, Synchronization is a maintenance operation.

There are two levels of synchronization:

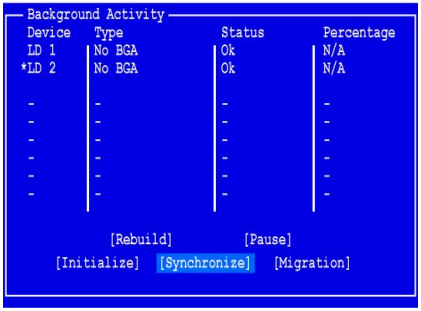
- Fix – Find and correct data and parity inconsistencies
- Check – Find and report data and parity inconsistencies, without correction. This process is sometimes called a Redundancy Check.

Synchronization applies to fault tolerant (RAID 1, 5, 6, 10 and 50) logical drives. When an logical drive is first created and you select Full Initialization, the same action as Synchronization takes place.

To Synchronize a logical drive:

1. In the Main Menu, highlight *Background Activity* and press Enter.

The Background Activity screen displays.

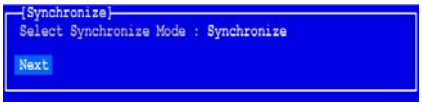


2. Highlight the logical drive you want to synchronize and press the spacebar to mark it.

   An asterisk (*) appears at the left of the selected logical drive.

3. Highlight *Synchronize* and press Enter.

   The Synchronize screen appears.



4. Highlight *Select Synchronization Mode* and press Enter.
5. From the popup list, highlight *Synchronize* or *Redundant Check*, then press Enter.

   Synchronize finds and *corrects* data and parity inconsistencies.

   Redundant Check finds and *reports* data and parity inconsistencies.

6. Highlight *Next* and press Enter.
7. Press Y to confirm the Synchronization operation on the selected logical drive.

   The Synchronization begins immediately. The length of time required depends on the size of the logical drive and other operations.

Pause

To pause the Synchronization:

1. In the Main Menu, highlight *Background Activity* and press Enter.

   The Background Activity screen displays.

2. Highlight the synchronizing logical drive and press the spacebar to mark it.

   An asterisk (*) appears at the left of the selected logical drive.

3. Highlight *Pause* and press Enter.

4. Press Y to confirm the pause.

   The Status of the synchronizing logical drive changes to Paused.

Resume

To resume the Synchronization:

1. In the Main Menu, highlight *Background Activity* and press Enter.

   The Background Activity screen displays.
2. Highlight the synchronizing logical drive and press the spacebar to mark it.

   An asterisk (*) appears at the left of the selected logical drive.
3. Highlight *Synchronize* and press Enter.
4. Press Y to confirm the Synchronization.

   The Status of the synchronizing logical drive changes to Running.

Migrate a Logical Drive

Migration is the process of:

- Changing the RAID level
- Adding physical drives but keeping the same RAID level

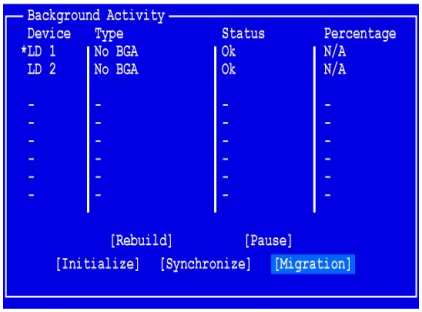
Migration is possible for most RAID logical drives but it is not available for JBOD.

Before you attempt to migrate your logical drive, see “Introduction to RAID” on page 111 and “Logical Drive Migration” on page 124 for more information.

To Migrate a logical drive:

1. In the Main Menu, highlight *Background Activity* and press Enter.

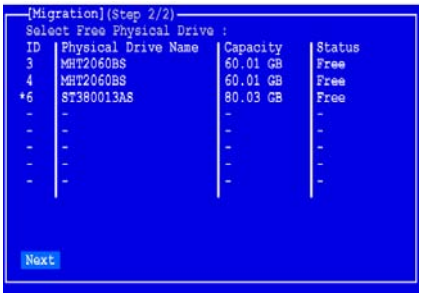
   The Background Activity screen displays.



2. Highlight the logical drive you want to migrate and press the spacebar to mark it.

   An asterisk (*) appears at the left of the selected logical drive.
3. Highlight *Migration* and press Enter.

The Migration Step 1/2 screen appears.



4. Highlight the Free physical (disk) drives you want to add to your logical drive and press the spacebar to mark them.

   An asterisk (*) appears at the left of the selected physical drive.

5. Highlight *Next* and press Enter.

   The Migration Step 2/2 screen appears.

6. Highlight *Select Translation Mode* and press Enter.

   From the popup list, highlight the target RAID level you want.

   The available target RAID levels depend on your current RAID level and the number of physical drives you chose to add.

7. Highlight *Next* and press Enter.
8. Press Y to confirm the Migrate operation on the selected logical drive.

   The Migrate operation begins immediately. The length of time required depends on the size of the logical drive and other operations.

Pause

To pause the Migration:

1. In the Main Menu, highlight *Background Activity* and press Enter.

   The Background Activity screen displays.

   Highlight the migrating logical drive and press the spacebar to mark it.

   An asterisk (*) appears at the left of the selected logical drive.

2. Highlight *Pause* and press Enter.
3. Press Y to confirm the pause.

   The Status of the migrating logical drive changes to Paused.

Resume

To resume the Migration:

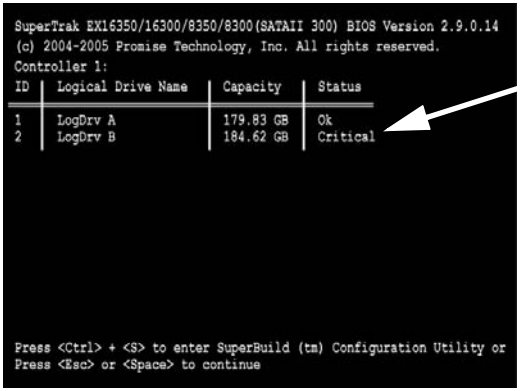
1. In the Main Menu, highlight *Background Activity* and press Enter.
   The Background Activity screen displays.
2. Highlight the migrating logical drive and press the spacebar to mark it.
   An asterisk (*) appears at the left of the logical drive.
3. Highlight *Migration* and press Enter.
4. Press Y to confirm the Migrate operation.
   The Status of the migrating logical drive changes to Running.

Logical Drive Problems

Fault-tolerant (RAID 1, 5, 10 and 50) logical drives go *Critical* when a physical drive fails. A RAID 6 logical drive goes *Degraded* when one physical drive fails and *Critical* when two physical drives fail.

Non-fault-tolerant logical drives (RAID 0) and JBOD go *Offline* when a physical drive fails.

When you boot your system, the SuperTrak BIOS screen informs you if there is a critical or offline logical drive.


SuperTrak EX16350/16300/8350/8300(SATAII 300) BIOS Version 2.9.0.14
(c) 2004-2005 Promise Technology, Inc. All rights reserved.
Controller 1:
ID | Logical Drive Name | Capacity | Status
1 | LogDrv A | 179.83 GB | Ok
2 | LogDrv B | 184.62 GB | Critical
Press <Ctrl> + <S> to enter SuperBuild (tm) Configuration Utility or
Press <Esc> or <Space> to continue

Logical Drive Critical

For a critical logical drive:

1. Press Ctrl-S to access the SuperBuild utility.
2. Replace the failed physical drive.
3. Rebuild the logical drive.

See “Rebuild a Logical Drive” on page 40.

See your PC’s User Manual for more information about replacing a physical drive.

Logical Drive Offline

When two physical drives have failed, the logical drive goes offline and cannot be rebuilt. If you can restore one of the failed physical drives to operation, the logical drive will be critical and you can rebuild it.

For an offline RAID 1, 5, 6, 10 or 50 logical drive:

1. Shut down the Host PC.
2. Open the case and check the power and data connections to each physical drive.
3. Correct any loose or faulty connections.

For an offline RAID 0 or JBOD, see “RAID 0 and JBOD” on page 50.

Hot Spare Drives

The WebPAM software includes a hot spare drive feature. See “Hot Spare Drive(s)” on page 123.

If a hot spare drive is available, the SuperTrak Controller will automatically begin rebuilding the logical drive with the hot spare. You must replace the failed drive, which becomes the new hot spare.

If a hot spare drive is not available, you must replace the failed drive, after which the SuperTrak controller will automatically rebuild the logical drive.

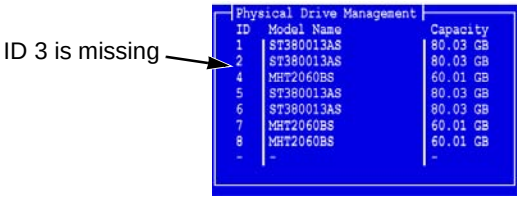
For more information about hot spare drives, see “Spare Drives” on page 106 and “Hot Spare Drive(s)” on page 123.

In either case, you must identify the failed drive so you can replace it. See “Identify a Failed Drive” below.

Identify a Failed Drive

To identify a failed physical drive:

1. In the Main Menu, highlight *Physical Drive Management* and press Enter.



2. Check the list of physical drives against the actual physical drives attached to the SuperTrak controller.

   In the example above, there is not physical drive for ID 3. Assuming you installed a physical drive onto Channel 3 of the SuperTrak controller, this is the failed physical drive.

   See page 9 for a diagram of Channel numbers on the SuperTrak controller.

RAID 0 and JBOD

Because RAID 0 and JBOD logical drives are not fault-tolerant, there is no way to rebuild the logical drive when a physical drive fails. After you replace the failed physical drive, you must create a new logical drive and copy your data to it from a backup source.

Chapter 5: WebPAM

- Log-in to WebPAM (page 51)
- Log-out of WebPAM (page 53)
- User Management (page 53)
- Host Management (page 61)
- Utility Configuration (page 62)
- SuperTrak (page 63)
- Controller (page 64)
- Physical Drives (page 69)
- Logical Drives (page 77)
- Enclosures (page 106)
- Spare Drives (page 106)
- Battery (page 108)

Log-in to WebPAM

Double-click on the WebPAM icon on your Windows desktop (right). Or,

1. Launch your Browser.
2. In the Browser address field, type the entry explained below.

   If you did *not* choose the External Security option during WebPAM installation (see page 19), use the *Regular* connection.

   If you chose the External Security option during WebPAM installation, use the *Secure* connection.

Regular Connection

- WebPAM uses an HTTP connection . . . . . .http://
- Enter the Host PC's IP address . . . . . .127.0.0.1 or localhost
- Enter the Port number . . . . . :8080
- Add to launch WebPAM . . . . . /promise

Together, your entry looks like this:

http://127.0.0.1:8080/promise or **http://localhost:8080/promise**

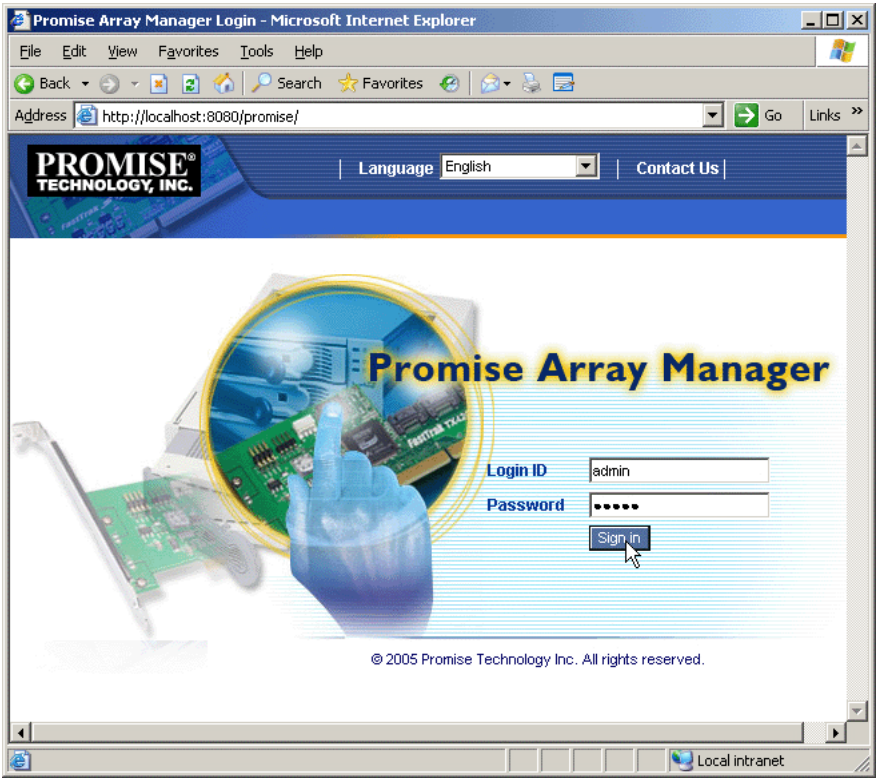
Secure Connection

- WebPAM uses a secure HTTP connection . . . . . .https://
- Enter the Host PC's IP address . . . . . .127.0.0.1 or localhost
- Enter the Port number . . . . . :8443
- Add to launch WebPAM . . . . . /promise

Together, your entry looks like this:

https://127.0.0.1:8443/promise or **https://localhost:8443/promise**

Note that the IP address shown above applies to a log-in at the Host PC. When you log in over a network, enter the Host PC's actual IP address or hostname.



When the opening screen (above) appears:

1. Type **admin** in the Login ID field.
2. Type **admin** in the Password field.
3. Click the **Sign in** button.

This is the default login for the Administrator. Each user will have their own Login ID (the User ID) and password. See “Add a User” on page 53 and “Change a User’s Password” on page 57 for more information.

The Login ID and Password are case sensitive.

Log-out of WebPAM

There are two ways to log out of WebPAM:

- Close your browser window
- Click **Logout** on the WebPAM banner (below)

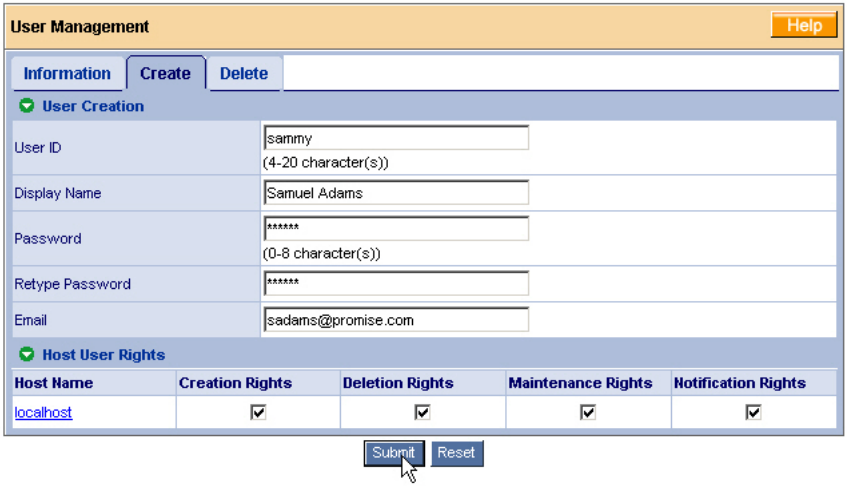
After logging out, you must enter your user name and password to log in again. Clicking **Logout** brings you back to the Login Screen.

User Management

- Add a User (below)
- Event Notification (page 54)
- Delete a User (page 57)
- Change a User's Password (page 57)
- Change a User's Email Address (page 58)
- Change a User's Access Rights (page 59)

Add a User

1. In Tree View, click on the User Management icon.
2. Click on the Create tab.



3. Type a User ID into the User ID field.

This will be the User's login name.

4. Type the user's display name into the Display Name field.

   This could be the User's actual name.

5. Type a password into the Password field.

   Use up to 8 letters and numbers but no spaces or other characters.

6. Type the same password into the Retype Password field.
7. If you plan to set up Event Notification, type the user's email address in the Email field.
8. Under Host User Rights, check the boxes to select rights for this user.

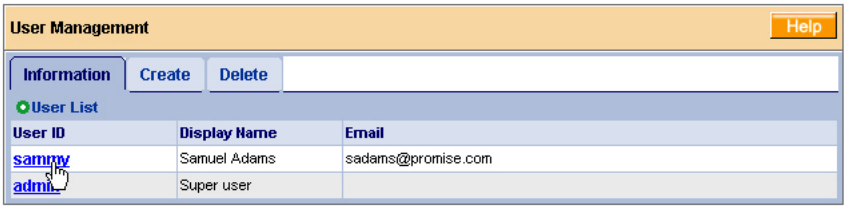
Right	Meaning
Creation	Permission to create a logical drive and a spare drive
Deletion	Permission to delete a logical drive and a spare drive
Maintenance	Permission to migrate, rebuild and synchronize a logical drive; to run Media Patrol on a physical drive; make controller and physical drive settings
Notification	Permission to receive notification of events affecting the logical drive

9. Click on the **Submit** button.

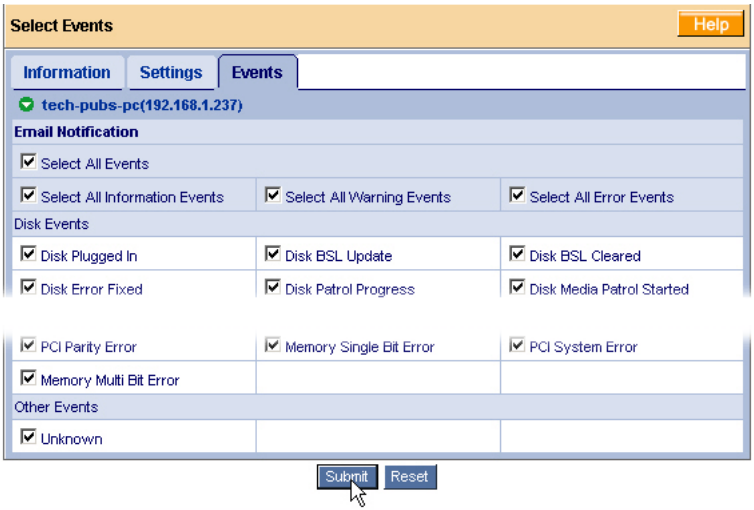
The new user will type the User ID and password to log into WebPAM. See "Log-in to WebPAM" on page 51.

Event Notification

1. In Tree View, click on the User Management icon.



2. Click on the User ID link.
3. Click on the Settings tab.



The image above was shortened to fit into the available space.

4. Check the boxes of the notification events that you want to have reported to you via email and popup messages.

   To select events by their severity, check one of the four Select Events boxes at the top of the window. See the table on the next page.

5. Click on the **Submit** button.

Event Notification Severity Levels

Information Events

Disk Plugged In
Disk BSL Update
Disk BSL Cleared
Disk Error Fixed
Disk Patrol Progress
Disk Media Patrol Started
Disk Media Patrol Completed
Disk Media Patrol Paused
Disk Media Patrol Resumed
Disk Media Patrol Aborted
Array Online
Array Created
Array Deleted
Array Cache Mode Changed
Array Auto Cache Mode Change
Synchronization Started
Synchronization Completed
Synchronization Paused
Synchronization Resumed
Synchronization Aborted
Synchronization Progress
Synchronization Inconsistency Fixed
Redundancy Check Started
Redundancy Check Completed
Redundancy Check Paused
Redundancy Check Resumed
Redundancy Check Aborted
Redundancy Check Progress
Rebuild Started
Rebuild Completed
Rebuild Paused
Rebuild Resumed
Rebuild Aborted
Rebuild Progress
Background Initialization Progress
Background Initialization Started
Background Initialization Completed
Background Initialization Paused
Background Initialization Resumed
Background Initialization Aborted
Migration Started
Migration Completed
Migration Paused
Migration Resumed
Migration Aborted
Migration Progress

Warning Events

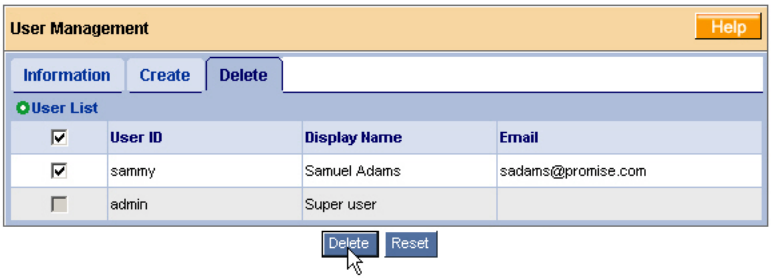
Disk Unplugged
Disk Timeout
Task Error
Disk Media Patrol Aborted with Error
Bad Block Remapped
Disk Pre Fail
Array Critical
Array Degrade
Synchronization Requested
Redundancy Check Rejected
Fan Error
Enclosure Voltage 3.3 Out Of Range
Enclosure Voltage 5 Out Of Range
Enclosure Voltage 12 Out Of Range
Enclosure Temperature Above Threshold
Battery Becomes Normal
Battery Temperature Out Of Range
Battery Temperature Unstable
Battery Voltage Out Of Range
Battery Voltage Unstable
Battery Communication Error
Battery Not Functioning
Battery Not Detected
PCI Parity Error
Memory Single Bit Error

Error Events

Disk Setdown
Disk Non-ECC Error
Disk S.M.A.R.T. Error
Synchronization Aborted with Error
Redundancy Check Aborted with Error
Redundancy Check Inconsistency Found
Rebuild Aborted with Error
Rebuild Aborted on Stream
Background Initialization Aborted with Error
Migration Aborted with Error
PCI System Error
Memory Multi Bit Error
Unknown Error

Delete a User

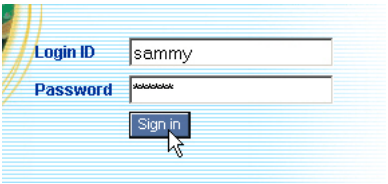
1. In Tree View, click on the User Management icon.
2. Click on the Delete tab.



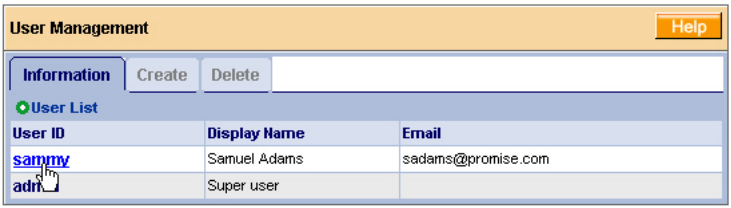
3. Check the box to the left of the user you want to delete.
4. Click the **Delete** button.
5. In the Confirmation box, click the **OK** button.

Change a User's Password

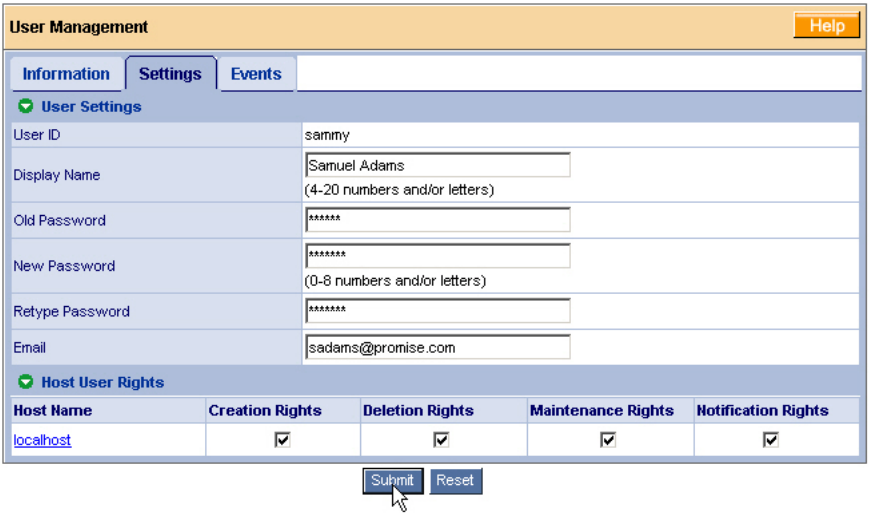
In WebPAM, each user can change his/her own password. To change a user's password:



1. Log into WebPAM under the User name.



2. Click on your User ID link.



3. Type the current password in the Old Password field.
4. Type a new password in the New Password field.
5. Retype the new password in the Retype Password field.
6. Click the **Submit** button.

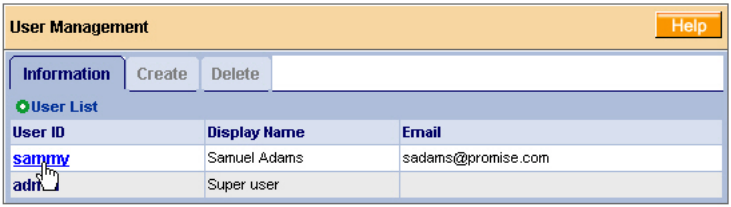
The new user will type the User ID and the new password to log into WebPAM. See “Log-in to WebPAM” on page 51

Important

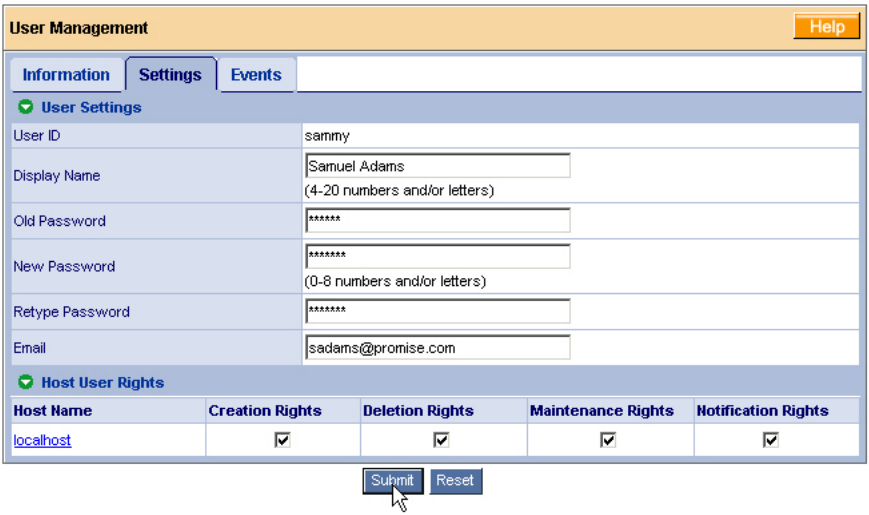
If a user forgets his/her password, the Administrator must delete that User and create a new User, as described above.

Change a User’s Email Address

In WebPAM, each user can change his/her own email address or the Administrator can do it. To change a user’s email address:



1. Click on the User ID link for the user whose email address will change.

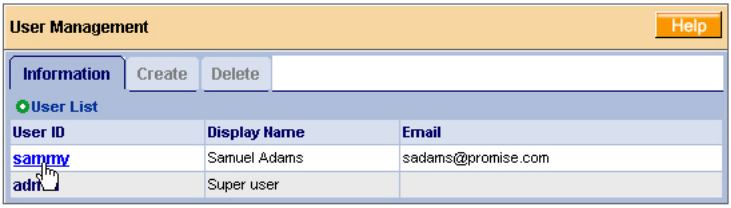


2. Type a new email address in the Email field.
3. Click the **Submit** button.

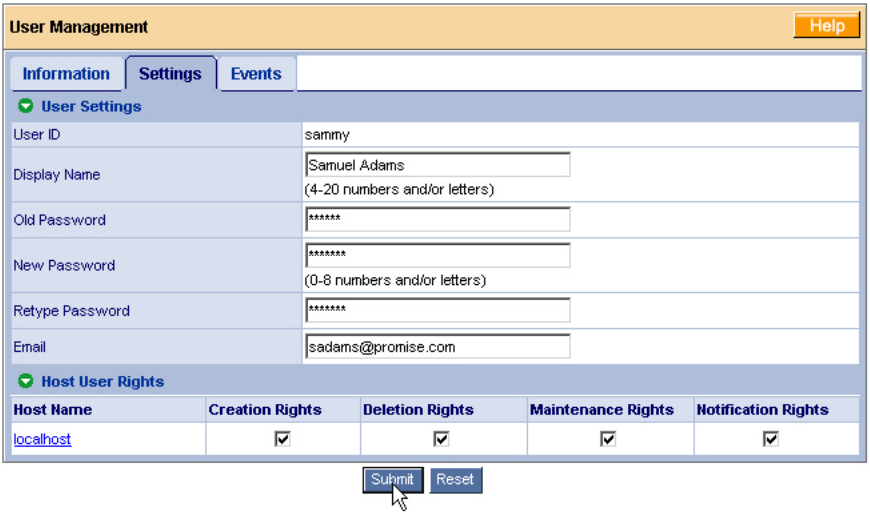
Change a User's Access Rights

In WebPAM, the Administrator can change a user's access rights. To change a user's access rights:

1. Log in as the Administrator.



2. Click on the User ID link for the user whose access rights will change.



3. Under Host User Rights, check the boxes to select rights for this user.

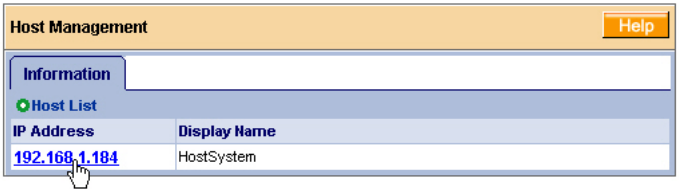
Right	Meaning
Creation	Permission to create a logical drive and a spare drive
Deletion	Permission to delete a logical drive and a spare drive
Maintenance	Permission to migrate, rebuild and synchronize a logical drive; to run Media Patrol on a physical drive; make controller and physical drive settings
Notification	Permission to receive notification of events affecting the logical drive

4. Uncheck the boxes of rights to be deleted.
5. Click the **Submit** button.

Host Management

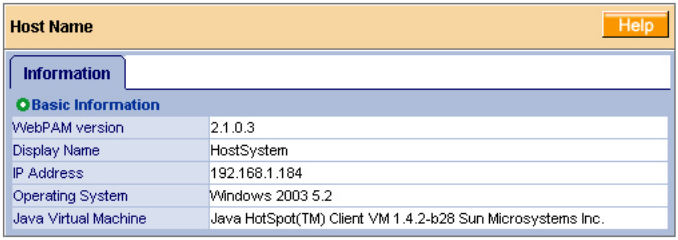
This function provides information only. There are no user settings. To access Host Management:

1. Under Administrative Tools in Tree View, click on the Host Management icon.



2. Under Host List, click on the link to the host you want to see.

   Host PCs are identified by their IP addresses.
   If there is no network connection, the link will be 127.0.0.1.



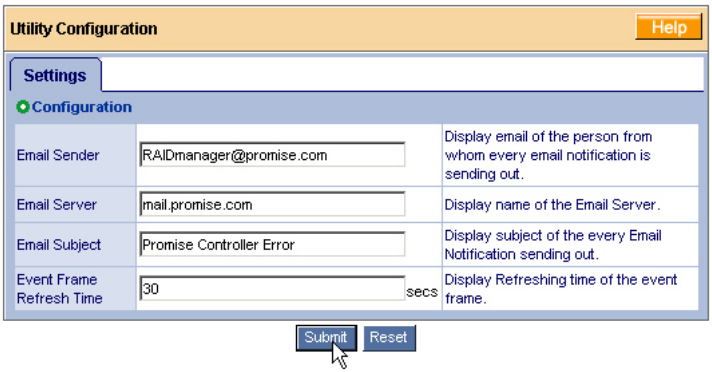
The Information tab displays with information about the Host PC.

- WebPAM Version – The version number of the WebPAM software.
- Display Name – The display name of the Host PC. “localhost” is the default.
- IP Address – The Host PC’s IP address, such as 192.168.1.184. If the Host PC has no network connection, 127.0.0.1 appears.
- Operating System – The Operating System running on the Host PC.
- Java Virtual Machine – The version number of JVM running on the Host PC.

Utility Configuration

Use this function to make email settings for WebPAM and also to set the refresh interval for the Event Frame.

1. Under Administrative Tools in Tree View, click on the Utility Configuration icon.



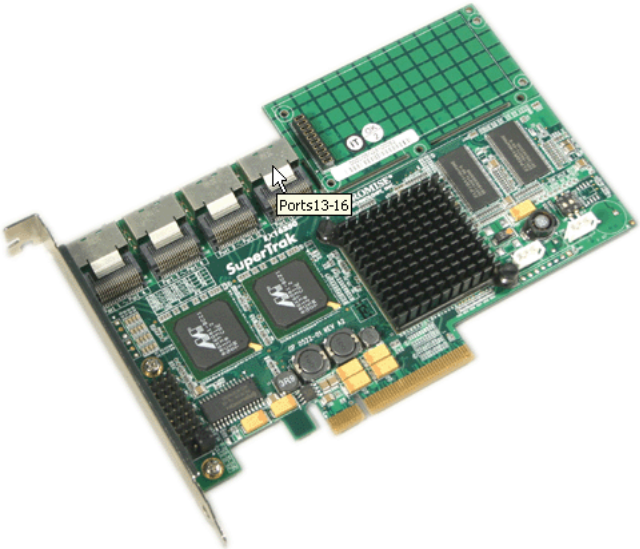
2. Enter the Sender's address in the Email Sender field.

   Be sure the sender has an account in your email system. See your IT administrator.
3. Enter your email server in the Email Server field.
4. Keep or change the Email Subject line.
5. Type a new interval (in seconds) in the Event Frame Refresh Time field.

   30 seconds is the default interval.
6. Click the **Submit** button when you are done.

SuperTrak

The SuperTrak–Information tab displays a photograph of the SuperTrak SX-Series RAID Controller installed in your system.



WebPAM will display the SuperTrak controller installed in your system.

To display this screen in Management View, click on the SuperTrak icon in Tree View.

With the screen displayed, move your cursor over key components of the SuperTrak controller card to see a Tool Tip popup message that identifies the component, as shown above.

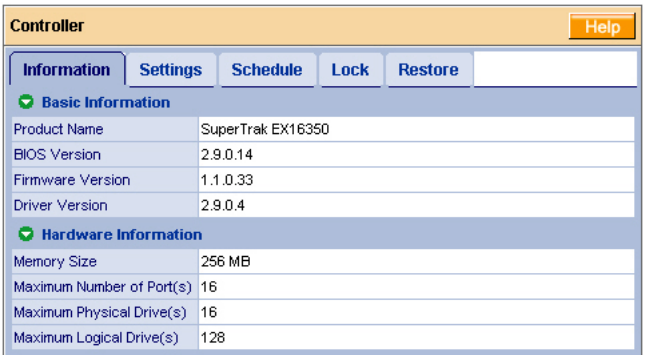
If you have multiple SuperTrak controller cards in the same system, they will appear under the SuperTrak icon as Controller 1, Controller 2, and so on.

Controller

- Controller Information (below)
- Controller Settings (page 65)
- Controller Schedule (page 66)
- Controller Lock (page 67)
- Controller Restore (page 68)

The term Controller refers to the device that controls your RAID. To access the controller, click on the Controller icon in Tree View.

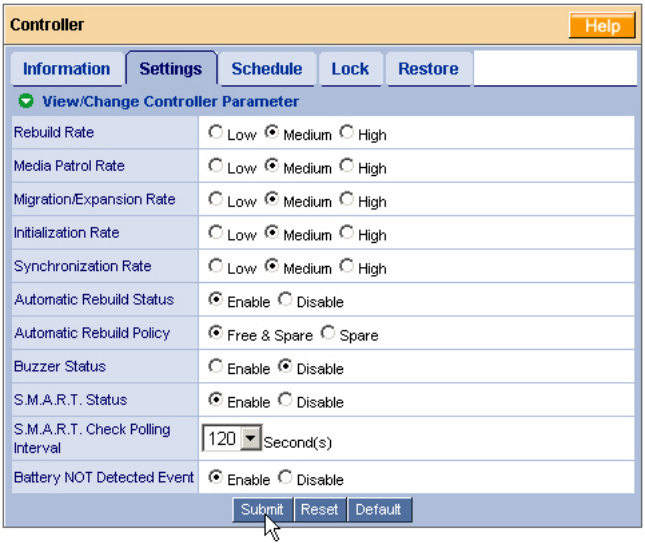
Controller Information



The Information tab displays with information about the controller.

- **Product Name** – The Promise product name for this controller.
- **BIOS Version** – Version number of the controller's BIOS.
- **Firmware Version** – Version number of the controller's firmware.
- **Driver Version** – Version number of the controller's software driver.
- **Maximum Number of Ports** – The number of ports on the controller.
- **Maximum Physical Drives** – The maximum number of physical (disk) drives the controller can support.
- **Maximum Logical Drives** – The maximum number of logical drives (arrays) the controller can support.

Controller Settings



Click on the Settings tab to access controller settings.

- **Rates** – Allocates system resources between the background process (such as Rebuild, Media Patrol, Expansion/Migration, Initialization and Synchronization) and the data read/write activity.

  A *High* setting assigns most of the system resources to background processes. The process will finished sooner but read/write requests are handled slower.

  A *Medium* setting tries to balance system resources between the background processes and data input/output activity.

  A *Low* setting assigns most of the system resources to handling read/write requests. Read/write requests are handled at nearly normal speed while the background processes take longer.
- **Automatic Rebuild Status** – When enabled, and a hot spare drive is available, a critical or degraded logical drive will rebuild itself automatically. Automatic Rebuilding applies to RAID 1 and 3-drive RAID 5 logical drives only.
- **Automatic Rebuild Policy** – Selects which physical drives to use as hot spares: Spare drives and Free drives or designated Spare drives only.
- **Buzzer** – When enabled, the motherboard's buzzer will sound to report a problem.
- **S.M.A.R.T. Status** – SMART, an acronym for Self-Monitoring Analysis and Reporting Technology, is a feature of the physical drive software. When

enabled, the SuperTrak controller polls the physical drives for SMART information and reports it to you.

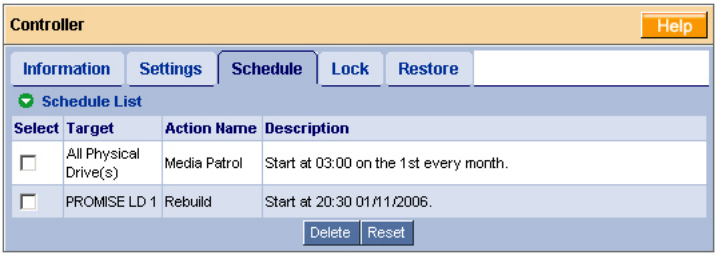
- **S.M.A.R.T. Check Polling Interval** – The SuperTrak controller periodically polls the physical drives for SMART information and displays it in WebPAM. Choose an interval from the dropdown menu. The range is 0 to 120 seconds. A setting of 0 seconds disables the polling function.
- **Battery Not Detected Event** – Enable this feature if you have a Battery Backup Unit installed on your SuperTrak controller. This feature will report a condition where the controller does not detect the battery. To prevent unnecessary messages, disable this feature if you do not have a battery. See “Event Notification” on page 54 and “Appendix C: Battery Backup Unit” on page 151.

After you make the desired changes, click the **Submit** button.

To clear changes without saving them, click the **Restore** button.

To reset controller settings to their default values, click the **Default** button.

Controller Schedule

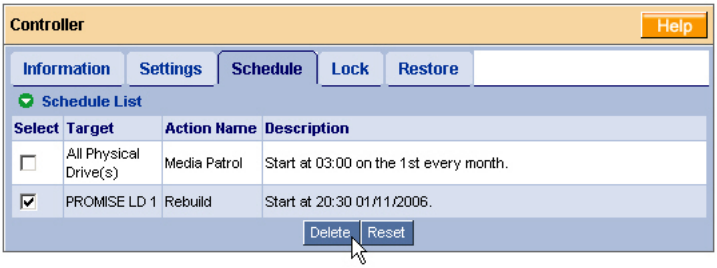


Click on the Schedule tab to access scheduled background processes (such as Rebuild, Media Patrol, Expansion/Migration, Initialization and Synchronization).

To access or schedule a Rebuild, Expansion, Migration, Initialization or Synchronization, click on the Logical Drive icon in Tree View then select the appropriate tab in Management View.

To access or schedule a Media Patrol, click on the Physical Drive icon in Tree View then select the Media Patrol tab in Management View.

Delete a Scheduled Process



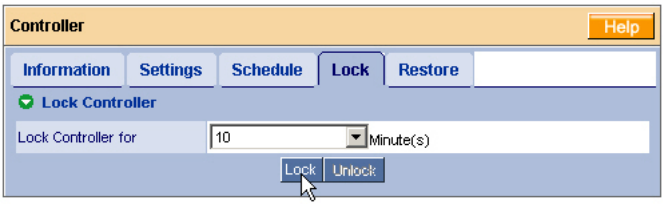
To delete a scheduled process:

1. Click on the Controller icon in Tree View.
2. Select the Schedule tab in Management View.
3. Check the box to the left of the process you want to delete.
4. Click the **Delete** button.
5. In the Confirmation box, click the **OK** button.

Alternative method to delete a scheduled process:

1. Go to its function tab under the Physical Drive icon or Logical Drive icon.
2. Under Schedule, click the **Disable** radio button.

Controller Lock



The Lock tab displays lock status and enables you to lock or unlock a subsystem controller. The locking mechanism isolates the controller during maintenance operations and other periods when you want to avoid interruption from other users trying to access the logical drives under this controller.

When you set the lock, other users have view-only access to physical drives and logical drives.

The lock releases when the selected period of time has passed or the user who set the lock clicks the **Unlock** button. Other users cannot release the lock.

To lock the Controller on the Host PC:

1. Click on the Controller icon in Tree View.
2. Select the Lock tab in Management View.
3. From the dropdown menu, select a period of time to hold the lock.

   The lock time range is 1 to 30 minutes.
4. Click on the **Lock** button to set the lock.

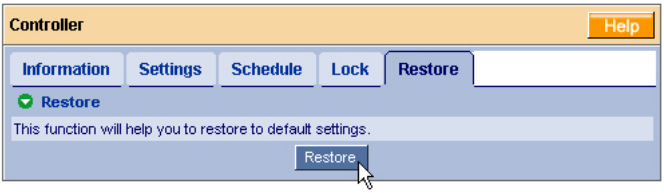
   The lock will release itself automatically at the end of the period you specified.

To release the lock before the scheduled time, click the **Unlock** button.

Notes

- While the lock is active, if you log into WebPAM under a different username, you have view-only access.
- If another user locks the controller, your screen does not update when the lock releases. Periodically click your browser's refresh button so that when the lock does release, your screen will show full access.

Controller Restore



The Restore tab resets all controller settings to their factory default values. Use this function when you are uncertain about what setting changes have been made or your RAID system is not working as expected.

To restore the default controller settings:

1. Click on the Controller icon in Tree View.
2. Select the Restore tab in Management View.
3. Click on the **Restore** button.
4. Click **OK** in the confirmation dialog box.

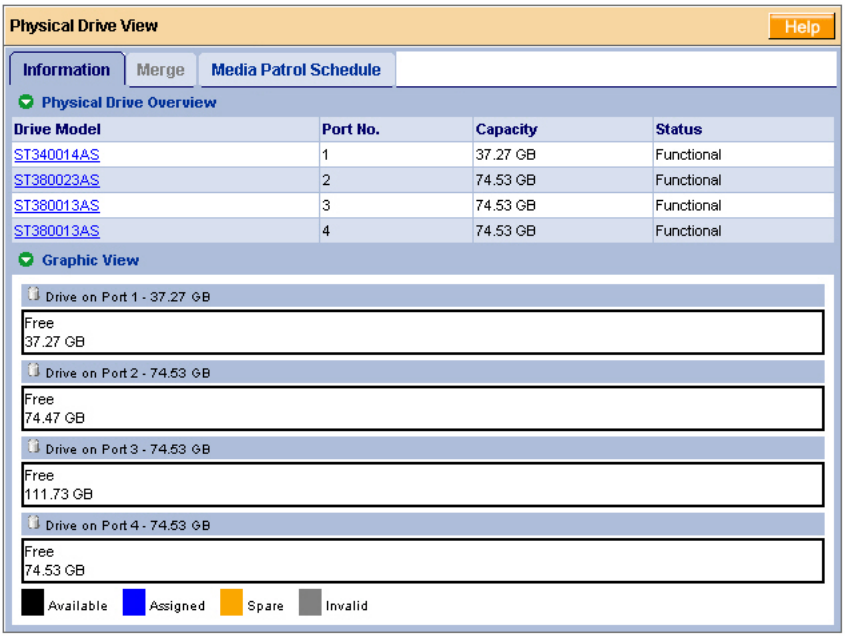
   The controller settings are automatically restored to their default values.

   See “Controller Settings” on page 65.

Physical Drives

- Physical Drive View (below)
- Merge a Physical Drive (page 69)
- Media Patrol Schedule (page 70)
- Physical Drive Information (page 71)
- Physical Drive Settings (page 73)
- Physical Drive Media Patrol (page 73)
- Physical Drive Bad Sector Log (page 75)
- Locate a Physical Drive (page 76)

Physical Drive View

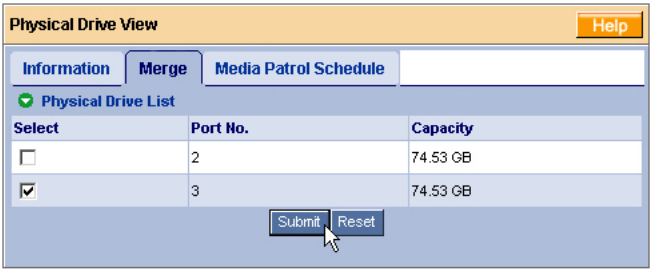


To access Physical Drive View, click on the Physical Drive View icon in Tree View. From this window, you can click on the links to access information and functions of individual physical drives and use the Merge feature.

Merge a Physical Drive

The action of merging a physical drive reunites the two portions of a split drive back into a single physical drive.

The Merge function is not available when either or both portions of the physical drive are assigned to a logical drive.



To merge a physical drive:

1. Click on the Physical Drive View icon in Tree View.
2. Click on the Merge tab in Management View.
3. Check the box(es) to the left of the physical drive(s) you want to merge.
4. Click the **Submit** button.

Click on a Physical Drive icon to see the results of your merge operation.

Media Patrol Schedule

The Physical Drive View–Media Patrol tab allows you to start Media Patrol on all physical drives. You can also run Media Patrol on individual physical drives, see page 73.

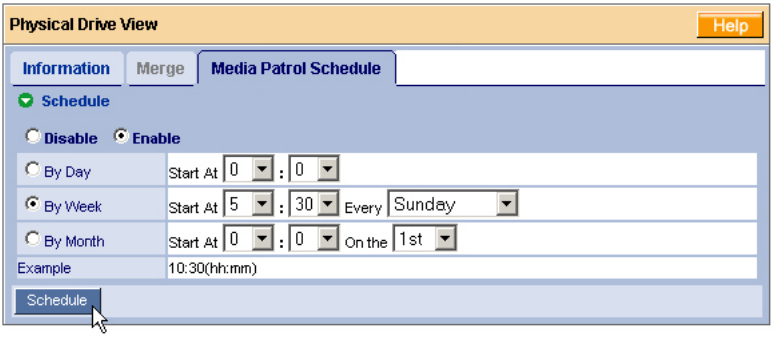
Media Patrol is a routine maintenance procedure that checks the magnetic media on each physical drive, sector by sector. Media Patrol checks physical drives assigned to logical drives, spare drives and currently unassigned physical drives that were once part of a logical drive or a spare. Media Patrol does not check new physical drives that have never been configured nor physical drives assigned as JBOD.

Unlike Synchronization and Redundancy Check, Media Patrol is concerned with the condition of the media itself, not the data recorded on the media. If Media Patrol encounters a suspect sector, it will attempt to regenerate the data and write to the suspect sector. If the write operation is successful, Media Patrol continues checking other sectors. If the write operation fails, Media Patrol reports the error to your PC's system log and to the physical drive's Bad Sector Log (see page 75). This action triggers a BSL update message and an email message if you enabled that notification option (see page 54).

To schedule Media Patrol:

1. Click on the Physical Drive View icon in Tree View.

2. Click on the Media Patrol tab in Management View.



3. Click on the **Enable** radio button.
4. Click on the **by Day**, **by Week** or **by Month** radio button.
5. From the dropdown menus, select a start time and a day of the Week or Month, if applicable.

   Start time is based on a 24-hour clock.
6. Click the **Schedule** button.

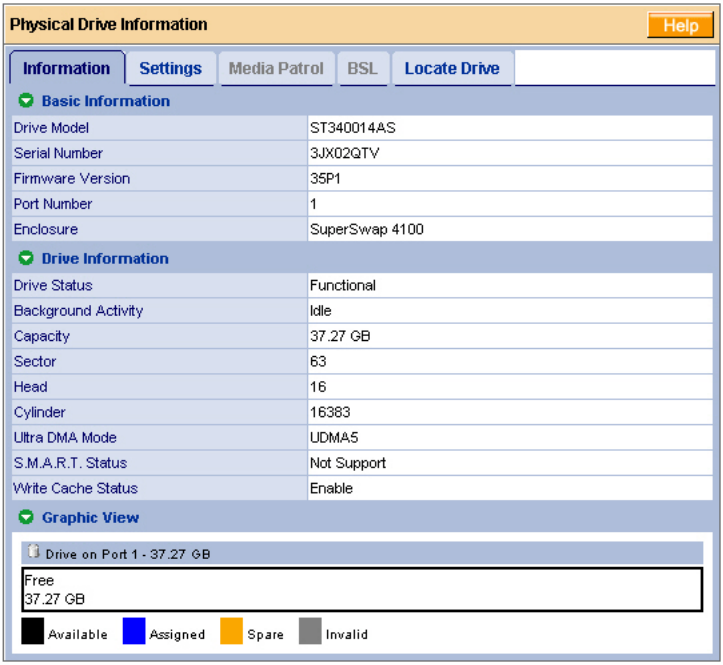
To cancel the scheduled Media Patrol operation:

1. Click on the Physical Drive View icon in Tree View.
2. Click on the Media Patrol tab in Management View.
3. Click the **Disable** radio button.

Physical Drive Information

To access information about a physical drive:

1. Click on the Physical Drive View icon in Tree View.
2. Click on the Physical Drive icon.



The information tab displays the following information:

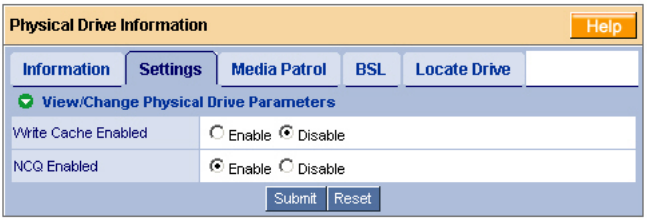
- **Drive Model** – The physical drive manufacturer's model name or number.
- **Serial Number** – The serial number of this physical drive.
- **Firmware Version** – The version number of the firmware on this physical drive.
- **Enclosure** – This feature does not apply to SuperTrak EX16300/EX16350.
- **Drive Status** – The operational of this physical drive. Functional means normal. Others include Offline.
- **Background Activity** – The current background activity affecting this physical drive. Idle means no activity. Others include Initializing and Rebuilding.
- **Capacity** – The data capacity of this physical drive in GB.
- **Sector** – The number of sectors on this physical drive.
- **Head** – The number of heads on this physical drive.
- **Cylinder** – The number of cylinders on this physical drive.
- **Ultra DMA Mode** – The UDMA mode in which this physical drive currently operates.

- **S.M.A.R.T. Status** – SMART, an acronym for Self-Monitoring Analysis and Reporting Technology, is a feature of the physical drive software. When this feature is supported, the drive will pass SMART information to the SuperTrak controller when it polls the physical drives.
- **Write Cache Status** – Indicates whether the physical drive's write cache is Enabled or Disabled. You can change this status under the Settings tab (see below).

Physical Drive Settings

Physical Drive Settings allows you to enable or disable the Write Cache and Native Command Queuing (NCQ) or Tagged Command Queuing (TCQ) on an individual physical drive. To access the physical drive setting:

1. Click on the Physical Drive View icon in Tree View.
2. Click on the Physical Drive icon.
3. Click on the Settings tab in Management View.



4. Click the Write Cache **Enable** or **Disable** radio button.
5. Click the NCQ or TCQ **Enable** or **Disable** radio button.

   If this option does not appear, the physical drive does not support NCQ or TCQ.
6. Click the **Submit** button.

Physical Drive Media Patrol

The Physical Drive–Media Patrol tab allows you to start Media Patrol on an individual physical drive. You can also run Media Patrol on all physical drives at the same time, see page 70.

Media Patrol is a routine maintenance procedure that checks the magnetic media on each physical drive, sector by sector. Media Patrol checks physical drives assigned to logical drives, spare drives and currently unassigned physical drives that were once part of a logical drive or a spare. Media Patrol does not check new physical drives that have never been configured nor physical drives assigned as JBOD.

Unlike Synchronization and Redundancy Check, Media Patrol is concerned with the condition of the media itself, not the data recorded on the media. If Media Patrol encounters a suspect sector, it will attempt to regenerate the data and write to the suspect sector. If the write operation is successful, Media Patrol continues checking other sectors. If the write operation fails, Media Patrol reports the error to your PC's system log and to the physical drive's Bad Sector Log (see page 75). This action triggers a BSL update message and an email message if you enabled that notification option (see page 54).

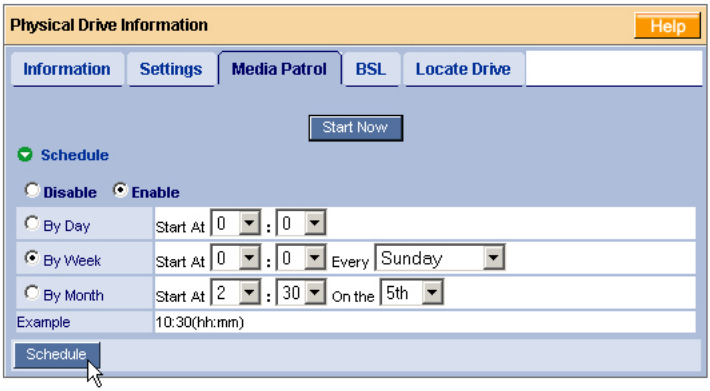
To start Media Patrol immediately:

1. Click on the Physical Drive View icon in Tree View.
2. Click on the Physical Drive icon.
3. Click on the Media Patrol tab in Management View.

4. Click the **Start Now** button.

To schedule Media Patrol to run at a later time:

1. Click on the Physical Drive View icon in Tree View.
2. Click on the Physical Drive icon.
3. Click on the Media Patrol tab in Management View.



4. Click on the Enable radio button.

5. Click on the **by Day**, **by Week** or **by Month** radio button.

   From the dropdown menus, select a start time and a day of the Week or Month, if applicable.

   Start time is based on a 24-hour clock.

6. Click the **Schedule** button.

To cancel the scheduled Media Patrol operation:

1. Click on the Physical Drive View icon in Tree View.
2. Click on the Physical Drive icon.
3. Click on the Media Patrol tab in Management View.
4. Click the **Disable** radio button.

Physical Drive Bad Sector Log

On occasion, an error can arise with the media on a physical drive. WebPAM keeps track of bad sectors in order to inform you of the condition of individual physical drives.

To access a physical drive's bad sector log:

1. Click on the Physical Drive View icon in Tree View.
2. Click on the Physical Drive icon.
3. Click on the BSL tab in Management View.

If any bad sectors are found, they are listed here. WebPAM informs you by popup and email messages when a bad sector error is logged (see page 54).

After 10 bad sectors have been discovered on a physical drive, WebPAM issues a warning to replace the drive.

After 20 bad sectors have been discovered:

- On fault-tolerant (RAID 1, 5, 6, 10 or 50) logical drives, the SuperTrak controller will set down the physical drive (take it offline) and the logical drive will go critical.

  Replace the physical drive and rebuild your logical drive.

- On non-fault-tolerant (RAID 0) logical drives, the physical drive remains online.

  Backup your data, replace the physical drive, create a new logical drive and copy your data to it.

See “Logical Drive Rebuild” on page 94 and “Logical Drive Critical / Offline” on page 102.

See the *SuperTrak User Manual* and your PC’s User Manual for more information about replacing a physical drive.

Locate a Physical Drive

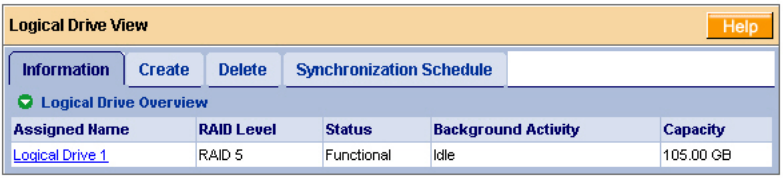
This feature does not apply to SuperTrak EX16300/EX16350.

Logical Drives

- Logical Drive View (below)
- Create a Logical Drive (page 77)
- JBOD (page 88)
- Delete a Logical Drive (page 88)
- Logical Drive Information (page 89)
- Logical Drive Settings (page 90)
- Logical Drive Migration (page 90)
- Logical Drive Rebuild (page 94)
- Synchronize/Redundancy Check All Logical Drives (page 97)
- Logical Drive Synchronization/ Redundancy Check (page 99)
- Logical Drive Initialization (page 101)
- Logical Drive Activation (page 102)

Logical Drive View

Logical Drive View provides a list of all logical drives currently on the Host PC. To access Logical Drive View, click on the Logical Drive View icon in Tree View.



From this screen, you can click on the links to access information and functions of individual logical drives and use the Create and Delete features.

Create a Logical Drive

A logical drive is a collection of physical drives in a RAID. You can create multiple logical drives from the same collection of physical drives, but you must create them one at a time.

- If you plan to create one logical drive and use the maximum capacity available, skip to “Create a Logical Drive” on page 78.
- If you plan to create multiple logical drives, you need to know the maximum capacity available in order to allocate the appropriate capacity to each logical drive. See Calculate Available Capacity, below.

Calculate Available Capacity

If you plan to create multiple logical drives based on the same physical drives, you need to know available capacity. This value is based on the RAID level, and the number and size of your physical drives.

With this information, you can choose how much capacity to allocate to each of the logical drives you plan to create.

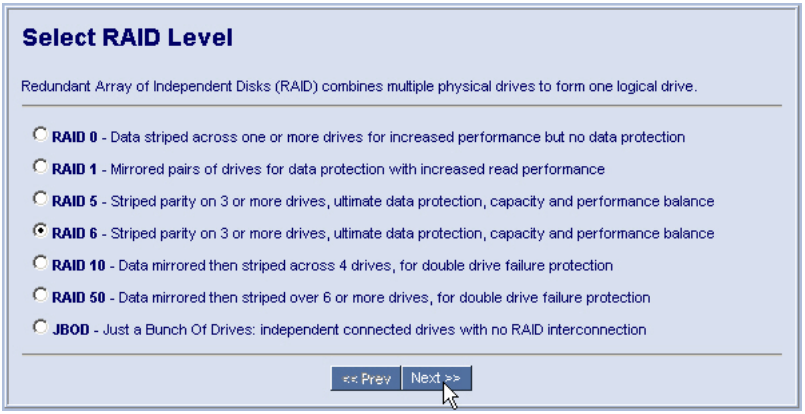
Level	Number of Drives	Logical Drive Capacity Equals
RAID 0	1 or more	Capacity of the smallest physical drive times the number of physical drives
RAID 1	2 only	Capacity of the smaller physical drive
RAID 5	3 or more	Capacity of the smallest physical drive times the number of physical drives, minus one
RAID 6	3 or more	Capacity of the smallest physical drive times the number of physical drives, minus two
RAID 10	4, 6, 8, 10, 12, 14 or 16	Capacity of the smallest physical drive time the number of physical drives, divided by two
RAID 50	6, 8, 10, 12, 14 or 16	Capacity of the smallest physical drive time the number of physical drives, minus two

Record the available capacity. You will need this information for step 6, below.

Create a Logical Drive

To create a new logical drive:

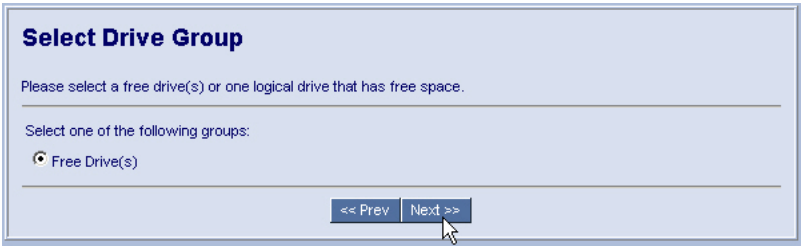
1. Click on the Logical Drive View icon.
2. Click on the Create tab.


Select RAID Level
Redundant Array of Independent Disks (RAID) combines multiple physical drives to form one logical drive.
RAID 0 - Data striped across one or more drives for increased performance but no data protection
RAID 1 - Mirrored pairs of drives for data protection with increased read performance
RAID 5 - Striped parity on 3 or more drives, ultimate data protection, capacity and performance balance
RAID 6 - Striped parity on 3 or more drives, ultimate data protection, capacity and performance balance
RAID 10 - Data mirrored then striped across 4 drives, for double drive failure protection
RAID 50 - Data mirrored then striped over 6 or more drives, for double drive failure protection
JBOD - Just a Bunch Of Drives: independent connected drives with no RAID interconnection
<< Prev
Next >>

3. Select the radio button beside the RAID level you want for your logical drive.

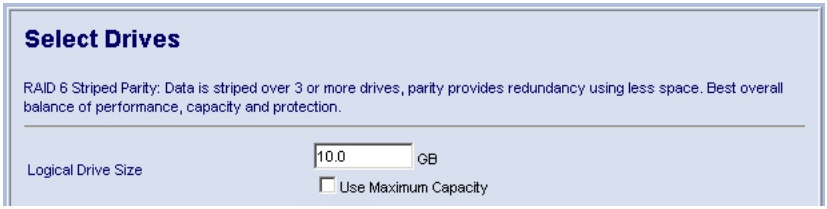
WebPAM displays the RAID levels you can use with the available physical drives. You can also select JBOD on this screen.

See “Choosing a RAID Level” on page 119 for information about the advantages and requirements of the available RAID levels and JBOD.

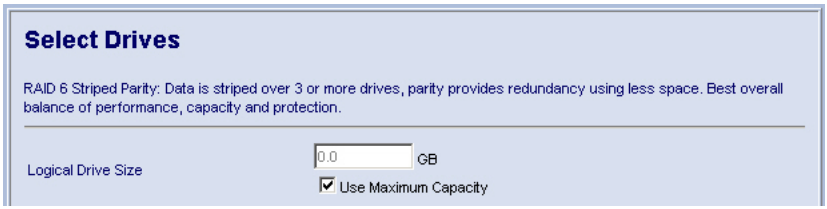

Select Drive Group
Please select a free drive(s) or one logical drive that has free space.
Select one of the following groups:
Free Drive(s)
<< Prev
Next >>

4. In the Select Drive Type screen, click on the radio button for one of the following:
   - **Free Drives** – Select all Free (unassigned) physical drives
   - **Logical Drive** – Select the Free portion of physical drives whose other portion is assigned to a Logical Drive

   The available choices depend on the RAID level you selected and the physical drives available.
5. Click the **Next** button.
6. Specify the size of this logical drive.

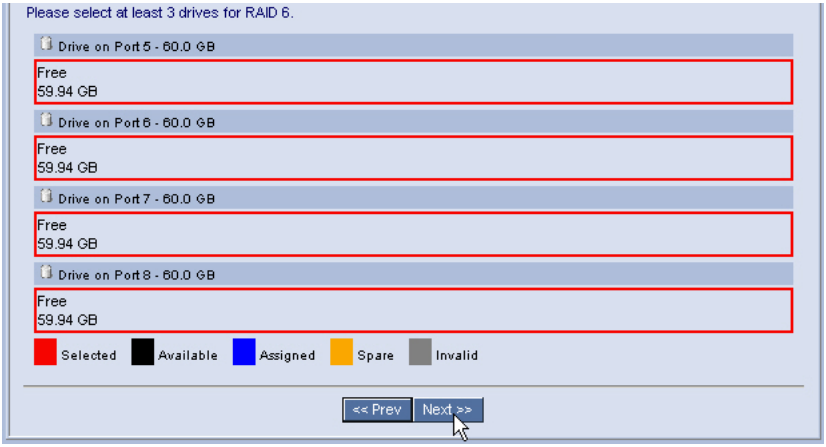

Select Drives
RAID 6 Striped Parity: Data is striped over 3 or more drives, parity provides redundancy using less space. Best overall balance of performance, capacity and protection.
Logical Drive Size
10.0
GB
Use Maximum Capacity

   - To create multiple logical drives using the same physical drives, uncheck the Use Maximum Capacity box and enter a capacity in the Logical Drive Size field.


Select Drives
RAID 6 Striped Parity: Data is striped over 3 or more drives, parity provides redundancy using less space. Best overall balance of performance, capacity and protection.
Logical Drive Size
0.0
GB
Use Maximum Capacity

- To create one logical drive or to create the last of multiple logical drives, leave the Use Maximum Capacity box checked.

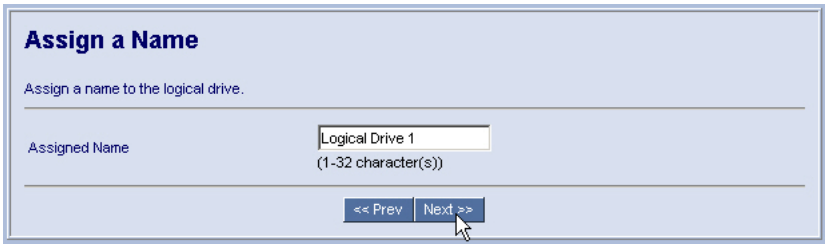
Refer to the available capacity you calculated under “Calculate Available Capacity” on page 77.



7. Click on the physical drives to select them.

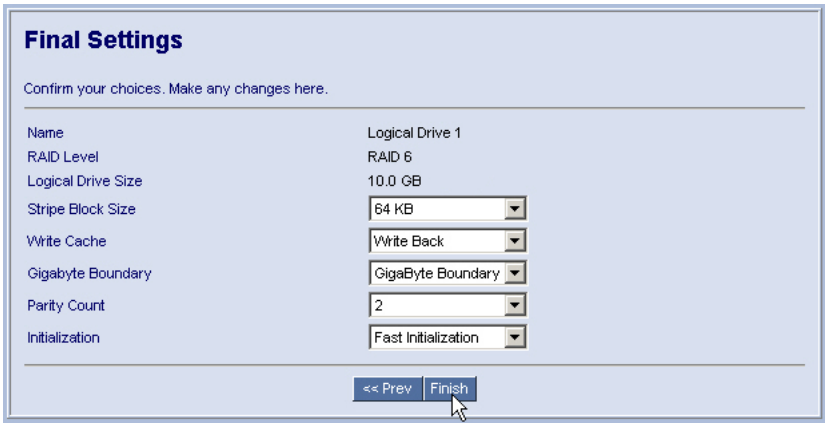
   Available drives have a black frame. Selected drives have a red frame.

8. Click the **Next** button.
   - If you selected JBOD in step 3, click the **Finish** button on the Select Drives screen. This completes the creation process for JBOD.
   - If you selected a RAID level in step 3, continue with step 9, below.



9. Enter a name for the logical drive in the field provided.

10. Click the **Next** button.



11. Select a Stripe Block Size from the dropdown menu.

    Choose from 32, 64 or 128 KB. The size selected affects how SuperTrak sends and receives data blocks to and from the drives. In general, a larger block size is better when handling large data transfers (such as A/V editing and graphics) while a smaller size is better when handling email and other common server data. The default is 64 KB. When in doubt, use the default value.

12. Select a Write Cache policy from the dropdown menu.
    - **Auto Switch** – The setting is made automatically. This is the default.
    - **Write Back** – Increases performance but can result in data loss in the event of a power failure.
    - **Write Through** – Slower but more secure.
13. Select a Gigabyte Boundary policy from the dropdown menu.
    - **GigaByte Boundary** – Rounds the size of the logical drive down to the nearest whole gigabyte. It allows you to install a slightly smaller (within 1 GB) replacement drive, should the need arise. This is the default.
    - **None** – No Boundary function.

14. Select an Initialization policy from the dropdown menu.
    - **Fast Initialization** – Erases the reserve and master boot sectors of the physical drives being added to the logical drive.

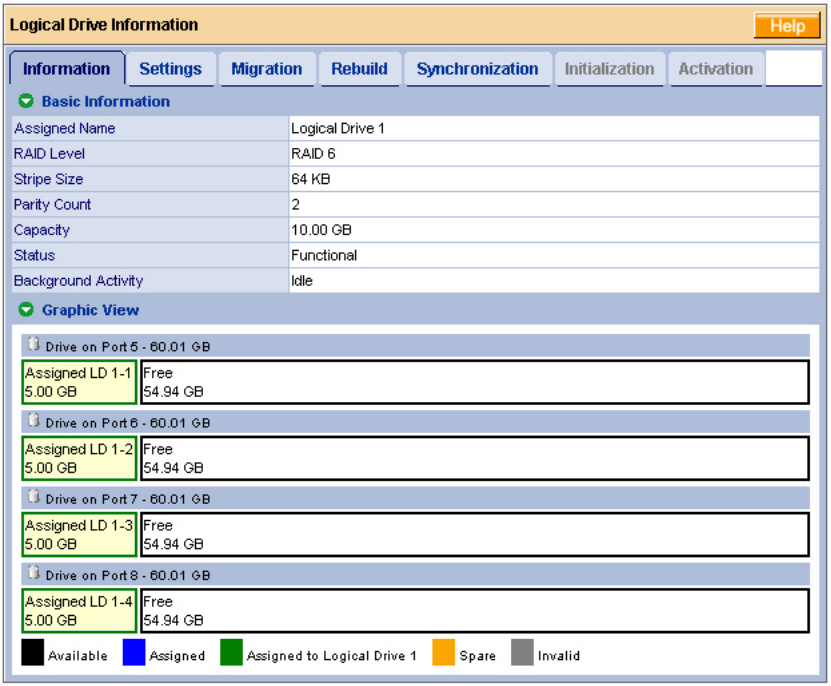
      If you select Fast Initialization, run Synchronize and Redundant check your logical drive after you create it. See “Logical Drive Synchronization/ Redundancy Check” on page 99.
    - **Full Initialization** – Erases all sectors of the physical drives being added to the logical drive. Recommended.
    - **None** – No initialization. Not recommended.
15. RAID 6 only. Select a Parity Count from the dropdown menu.
    RAID 50 only. Select a Sub Array Count from the dropdown menu.

    Both of these settings have only their default values with this version of SuperTrak.

    For information on these choices, see page 115 and page 117.
16. Click the **Finish** button.

    If there is capacity available, the Select RAID Level screen appears again, where you can create an additional logical drive.
    - To create another logical drive using the same physical drives, see “Create Another Logical Drive” on page 84.
    - To create another logical drive using different physical drives, return to “Create a Logical Drive” on page 78.

Logical Drive in WebPAM



Click on the Logical Drive Icon to see all of the information about your new logical drive.

In the example above, only a portion of the physical drives are assigned to this logical drive. This is the result of using less than the maximum available capacity when the logical drive was created. See “Specify the size of this logical drive.” on page 79.

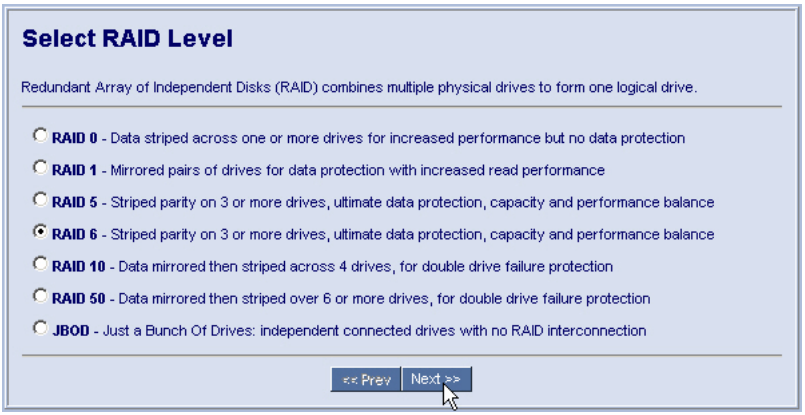
If the Use Maximum Capacity box had been checked, the full length of the physical drives would be assigned to this logical drive.

Before you can use your new logical drive, you must partition and format the logical drive using your PC’s operating system. See “Appendix A: Partition and Format” on page 139 for more information.

Create Another Logical Drive

Use this procedure if you unchecked the Use Maximum Capacity box and entered a capacity in the Logical Drive Size field when you created your previous logical drive.

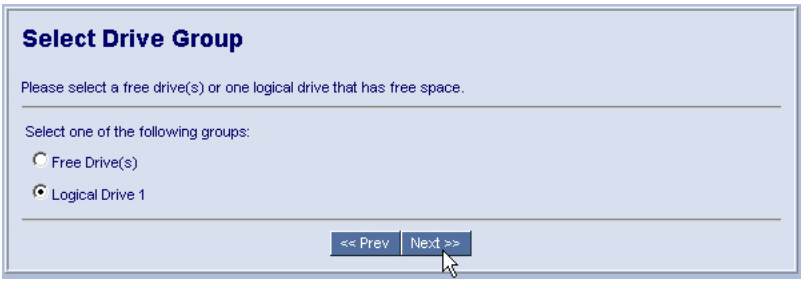
To create another logical drive using the same physical drives:


Select RAID Level
Redundant Array of Independent Disks (RAID) combines multiple physical drives to form one logical drive.
RAID 0 - Data striped across one or more drives for increased performance but no data protection
RAID 1 - Mirrored pairs of drives for data protection with increased read performance
RAID 5 - Striped parity on 3 or more drives, ultimate data protection, capacity and performance balance
RAID 6 - Striped parity on 3 or more drives, ultimate data protection, capacity and performance balance
RAID 10 - Data mirrored then striped across 4 drives, for double drive failure protection
RAID 50 - Data mirrored then striped over 6 or more drives, for double drive failure protection
JBOD - Just a Bunch Of Drives: independent connected drives with no RAID interconnection
<< Prev
Next >>

1. Select the radio button beside the RAID level you want for your logical drive.

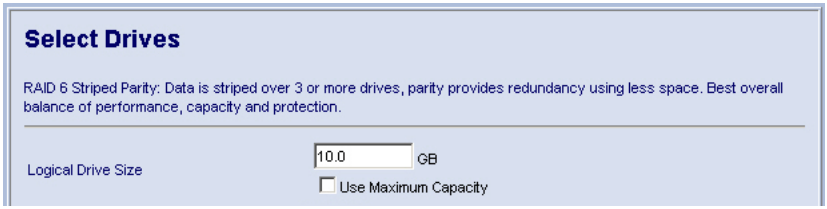
   WebPAM displays the RAID levels you can use with the available physical drives. You can also select JBOD on this screen.

   See “Choosing a RAID Level” on page 119 for information about the advantages and requirements of the available RAID levels and JBOD.

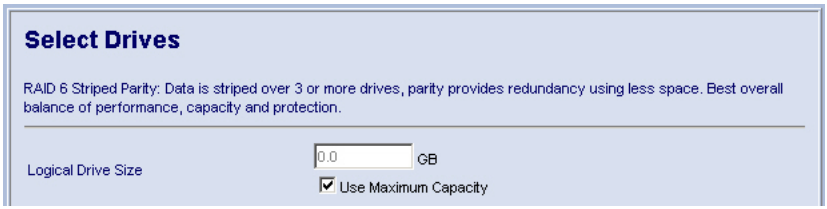

Select Drive Group
Please select a free drive(s) or one logical drive that has free space.
Select one of the following groups:
Free Drive(s)
Logical Drive 1
<< Prev
Next >>

2. In the Select Drive Type screen, click on the Logical Drive radio button to select the same physical drives as the previous logical drive.
3. Click the **Next** button.

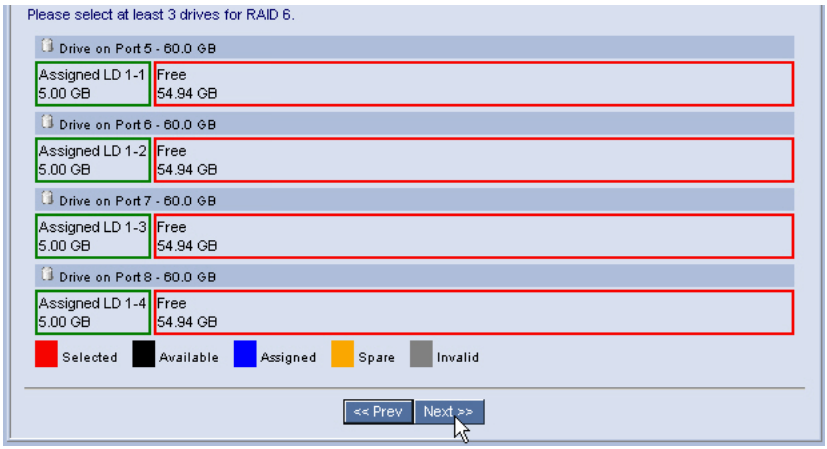
4. Specify the size of this logical drive.


Select Drives
RAID 6 Striped Parity: Data is striped over 3 or more drives, parity provides redundancy using less space. Best overall balance of performance, capacity and protection.
Logical Drive Size
10.0
GB
Use Maximum Capacity

- To create additional logical drives with the same physical drives, uncheck the Use Maximum Capacity box and enter a capacity in the Logical Drive Size field.

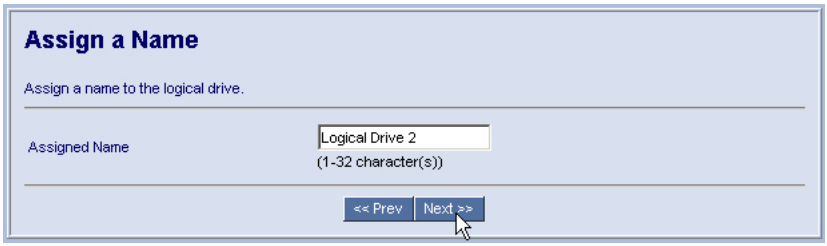

Select Drives
RAID 6 Striped Parity: Data is striped over 3 or more drives, parity provides redundancy using less space. Best overall balance of performance, capacity and protection.
Logical Drive Size
0.0
GB
Use Maximum Capacity

- To create the last of multiple logical drives, leave the Use Maximum Capacity box checked.

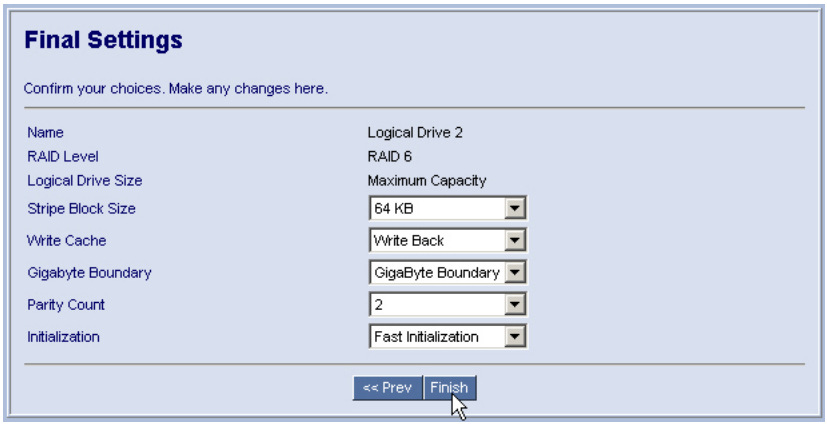


The physical drives are already selected and display a red frame.

5. Click the **Next** button.



6. Enter a name for the logical drive in the field provided.
7. Click the **Next** button.



8. Select a Stripe Block Size from the dropdown menu.

   Choose from 32, 64 or 128 KB. The size selected affects how SuperTrak sends and receives data blocks to and from the drives. In general, a larger block size is better when handling large data transfers (such as A/V editing and graphics) while a smaller size is better when handling email and other common server data. The default is 64 KB. When in doubt, use the default value.
9. Select a Write Cache policy from the dropdown menu.
   - **Auto Switch** – The setting is made automatically. This is the default.
   - **Write Back** – Increases performance but can result in data loss in the event of a power failure.
   - **Write Through** – Slower but more secure.

10. Select a Gigabyte Boundary policy from the dropdown menu.
    - **GigaByte Boundary** – Rounds the size of the logical drive down to the nearest whole gigabyte. It allows you to install a slightly smaller (within 1 GB) replacement drive, should the need arise. This is the default.
    - **None** – No Boundary function.
11. Select an Initialization policy from the dropdown menu.
    - **Fast Initialization** – Erases the reserve and master boot sectors of the physical drives being added to the logical drive.

      If you select Fast Initialization, run Synchronize and Redundant check your logical drive after you create it. See “Logical Drive Synchronization/ Redundancy Check” on page 99.
    - **Full Initialization** – Erases all sectors of the physical drives being added to the logical drive. Recommended.
    - **None** – No initialization. Not recommended.
12. RAID 6 only. Select a Parity Count from the dropdown menu.
    RAID 50 only. Select a Sub Array Count from the dropdown menu.

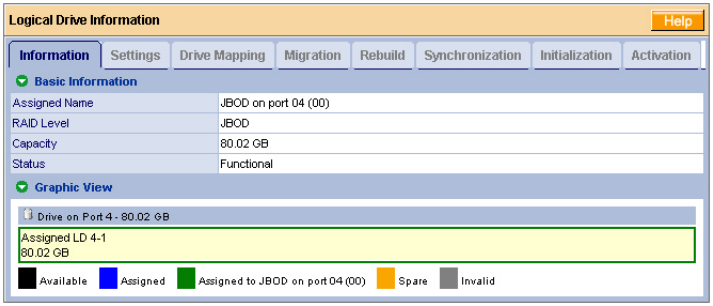
    Both of these settings have only their default values with this version of SuperTrak.

    For information on these choices, see page 115 and page 117.
13. Click the **Finish** button.

    If there is capacity available, the Select RAID Level screen appears again, where you can create an additional logical drive.
    - To create another logical drive using the same physical drives, see “Create Another Logical Drive” on page 84.
    - To create another logical drive using different physical drives, return to “Create a Logical Drive” on page 78.

JBOD

In WebPAM, JBOD is created, managed and deleted the same as a logical drive. You can also use the SuperTrak BIOS for this purpose. See “Create a Logical Drive” on page 37.



JBODs do not have Settings, Rebuild, Migration, Synchronization or other functions that pertain to RAID logical drives.

If you attach a physical drive that was initialized using Windows disk management, that drive will be automatically recognized as a JBOD by the SuperTrak controller and WebPAM.

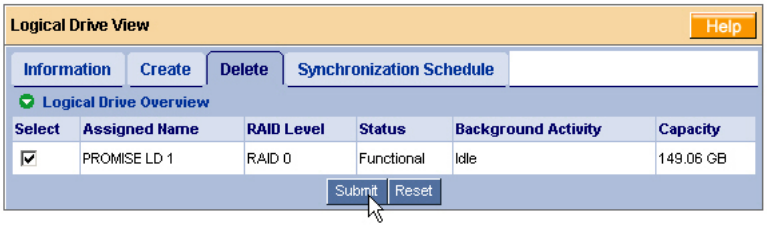
Delete a Logical Drive

Warning

When you delete a logical drive, you delete all data on the logical drive. Be sure to backup any important data before you delete a logical drive!

To delete a logical drive:

1. Click on the Logical Drive View icon.
2. Select the Delete tab.



3. Check the box to the left of the logical drive you want to delete.

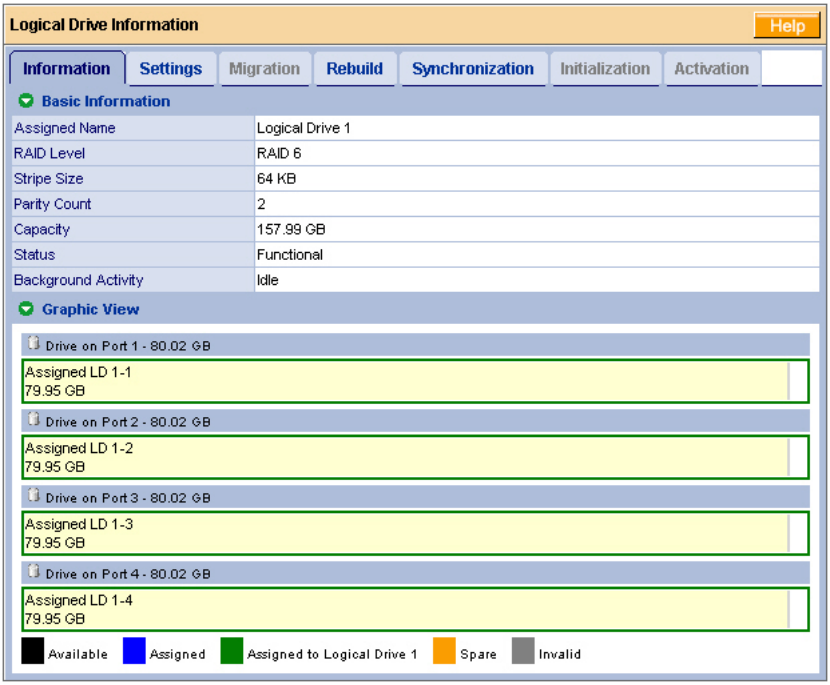
4. Click the **Submit** button.
5. In the Confirmation box, click the **OK** button.
6. In the Warning box, click the **OK** button.

The selected logical drive is deleted.

Logical Drive Information

Logical Drive View provides a list of all logical drives currently on the Host PC. To access Logical Drive View:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon of the logical drive you want to see.

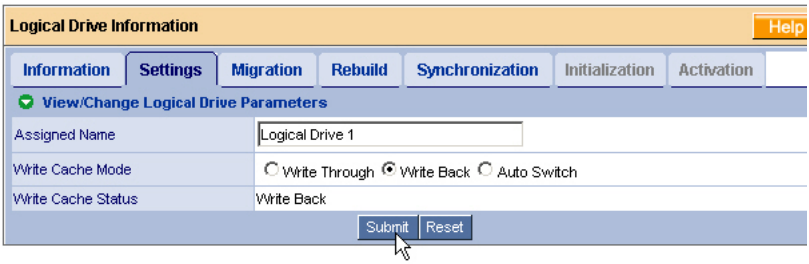


From this screen, you can click on the links to access the Settings, Migration, Rebuild, Synchronization, Initialization and Activation features. The features that apply to this logical drive have blue tabs. Features that do not apply have grayed tabs.

Logical Drive Settings

Logical Drive Settings allows you to assign a name to a logical drive and to change its controller cache settings. To access logical drive settings:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon of the logical drive you want to see.
3. Click on the Settings tab in Management View.



4. Enter a name in the Assigned Name field, as desired.
5. Click the radio button to select cache mode.
   - **Write Back** – Increases performance but can result in data loss in the event of a power failure. This is the default.
   - **Write Through** – Slower but more secure.
   - **Auto Switch** – The setting is made automatically.
6. Click the **Submit** button when you are done.

Logical Drive Migration

The Logical Drive–Migration tab enables you to migrate a logical drive. Migration is the process of:

- Changing the RAID level
- Adding physical drives but keeping the same RAID level

Migration is possible for most RAID logical drives but it is not available for JBOD.

In the migration process, the existing logical drive is called the *Source*. The proposed logical drive is called the *Target*.

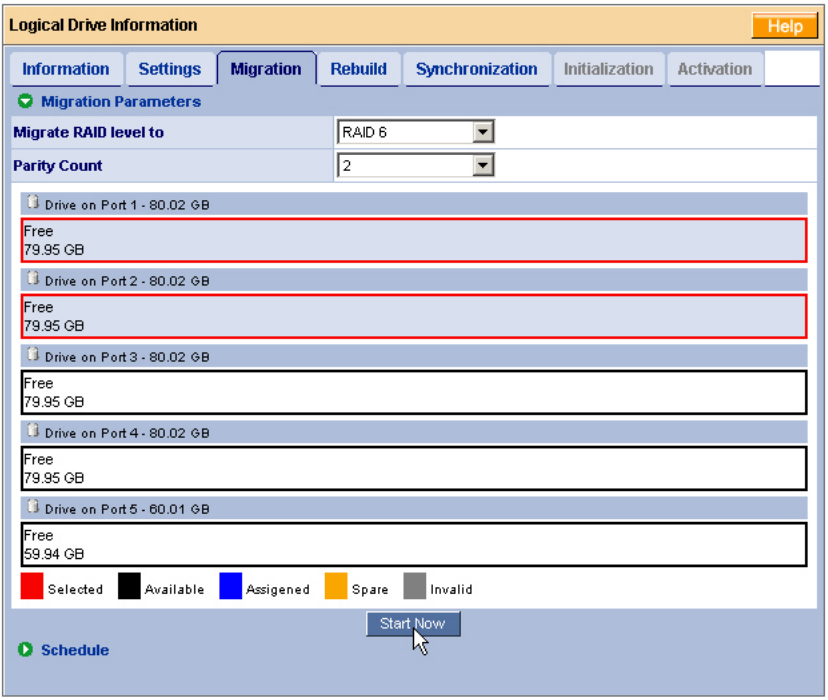
Each target logical drive has certain requirements and they are different for each RAID level. You must meet all of the requirements in order to successfully migrate a logical drive. See “Choosing a RAID Level” on page 119 and “Logical Drive Migration” on page 124 for more information.

You can set up an Migration to begin immediately (on demand) or schedule a Migration for a time when there is less demand on the RAID system.

On Demand

To migrate a logical drive:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon of the logical drive you want to migrate.
3. Click on the Migration tab in Management View.



4. Select the Target RAID level.

   Click on the dropdown menu labelled Migrate RAID level to.

5. RAID 6 only. Select a Parity Count from the dropdown menu.
   RAID 50 only. Select a Sub Array Count from the dropdown menu.

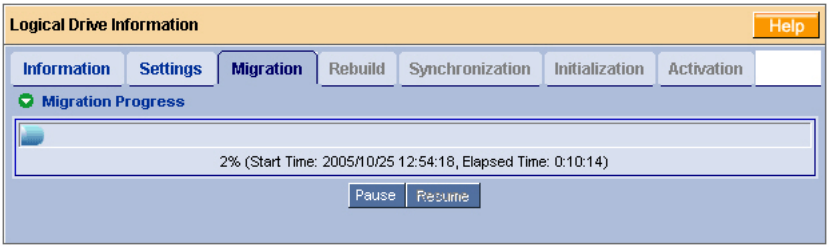
   Both of these settings have only their default values with this version of SuperTrak.

   For information on these choices, see page 115 and page 117.

6. If the Migration requires additional physical drives, click on a free physical drive to select it.

   Available drives have a black frame. Selected drives have a red frame.

7. Click the **Start Now** button.

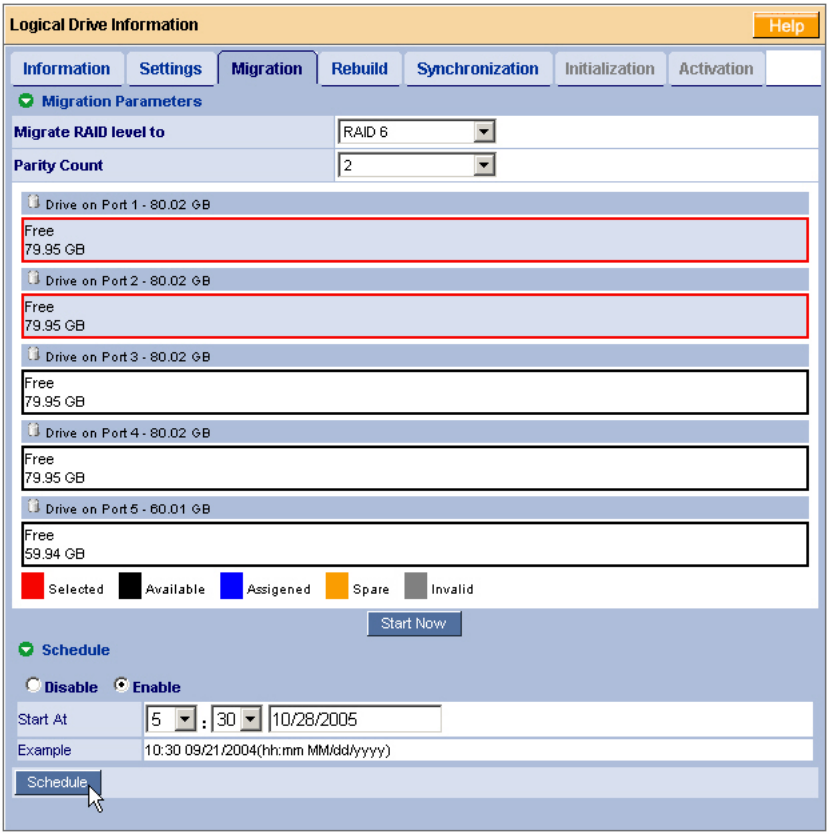


You can monitor Migration or Expansion progress on the Logical Drive Migration tab. Click the respective buttons to pause and resume the Migration.

Scheduled

To schedule a Migration or Expansion:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon of the logical drive you want to migrate or expand.
3. Click on the Migration tab in Management View.



4. Select the Target RAID level.

   Click on the dropdown menu labelled Migrate RAID level to.

5. RAID 6 only. Select a Parity Count from the dropdown menu.
   RAID 50 only. Select a Sub Array Count from the dropdown menu.

   Both of these settings have only their default values with this version of SuperTrak.

   For information on these choices, see page 115 and page 117.

6. Click on a free physical drive to select it.

   Available drives have a black frame. Selected drives have a red frame.

7. Click on the **Enable** radio button.

8. From the dropdown menus, select a start time.

   Start time is based on a 24-hour clock.

9. Click in Start At field to display a popup calendar.
10. Click on the start date in the calendar or enter a date manually.
11. Click the **Schedule** button.

Cancel a Schedule

If you want to cancel the scheduled Migration, do the following:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon.
3. Click on the Migration tab in Management View.
4. Click on the **Disable** radio button.

Logical Drive Rebuild

Rebuild refers to the process of repairing a logical drive by reconstruction the data on one of its physical drives.This feature only applies to logical drives with redundancy, RAID 1, 5, 6, 10 and 50.

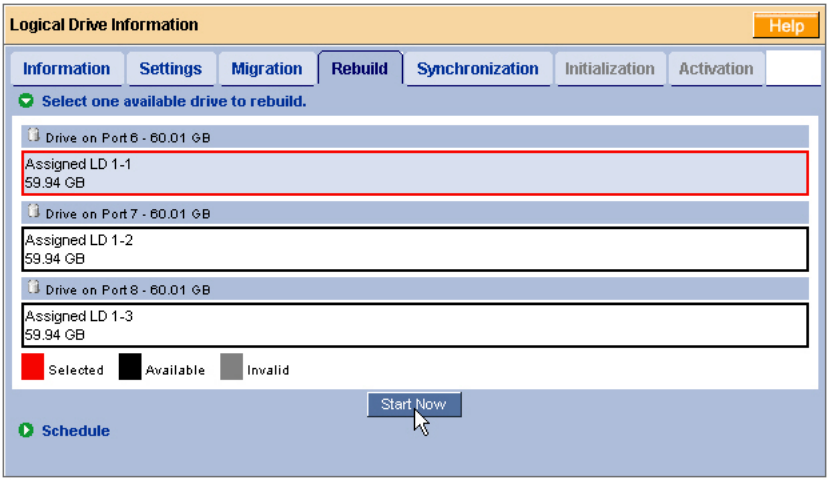
You can set up a Rebuild to:

- Begin immediately (on demand)
- Schedule a Rebuild for a time when there is less demand on the RAID system
- Begin automatically when a logical drive goes critical or degraded (see “Create a Spare Drive” on page 106)

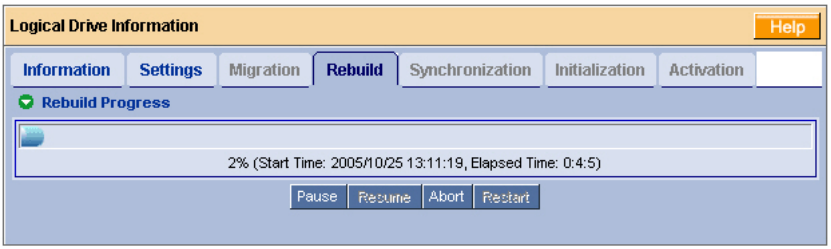
On Demand

To rebuild a logical drive:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon of the logical drive you want to rebuild.
3. Click on the Rebuild tab in Management View.



4. Select the logical drive you want to rebuild.
   Available drives have a black frame. Selected drives have a red frame.
5. Click the **Start Now** button.

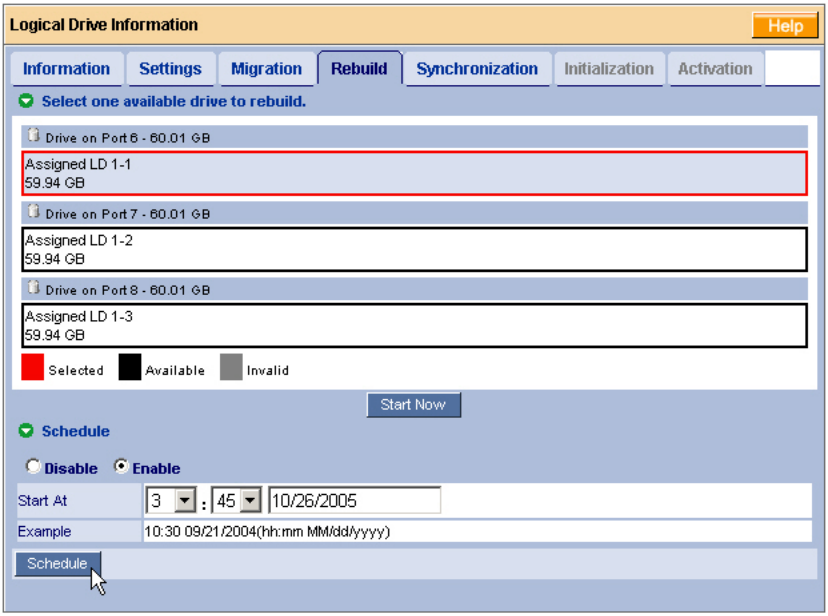


You can monitor Rebuild progress on the Logical Drive Rebuild tab. Click the respective buttons to pause and resume the Rebuild.

Scheduled

To schedule a Rebuild:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon of the logical drive you want to rebuild.
3. Click on the Rebuild tab in Management View.



4. Select the physical drive you want to rebuild.
   Available drives have a black frame. Selected drives have a red frame.
5. Click on the **Enable** radio button.
6. From the dropdown menus, select a start time.
   Start time is based on a 24-hour clock.
7. Click in Start At field to display a popup calendar.
8. Click on the start date in the calendar or enter a date manually.
9. Click the **Schedule** button.

Cancel a Schedule

If you want to cancel the scheduled Rebuild, do the following:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon.
3. Click on the Rebuild tab in Management View.
4. Click on the **Disable** radio button.

Automatic Rebuild

Automatic rebuilding of a logical drive is possible under the following conditions:

- The logical drive is a RAID 1, 5, 6, 10 or 50.
  See “Create a Logical Drive” on page 77.
- There is a spare drive present in the RAID system.
  See “Create a Spare Drive” on page 106.
- Automatic Rebuild Status is enabled in the Controller Settings.
  See “Controller Settings” on page 65.

If the three above conditions are met, a logical drive will replace a faulty physical drive and rebuild itself automatically. WebPAM will report the critical logical drive and automatic rebuild in its user interface as well as via popup messages. Depending on your Event Notification settings (see page 54), WebPAM can also notify you via email message.

When the automatic rebuild operation is completed, you must remove and replace the faulty physical drive with a new one.

See “Replace the Failed physical drive” on page 104 for more information.

Synchronize/Redundancy Check All Logical Drives

The Logical Drive View–Synchronization Schedule tab enables you to synchronize all logical drives. You can also synchronize an individual logical drive, see page 99.

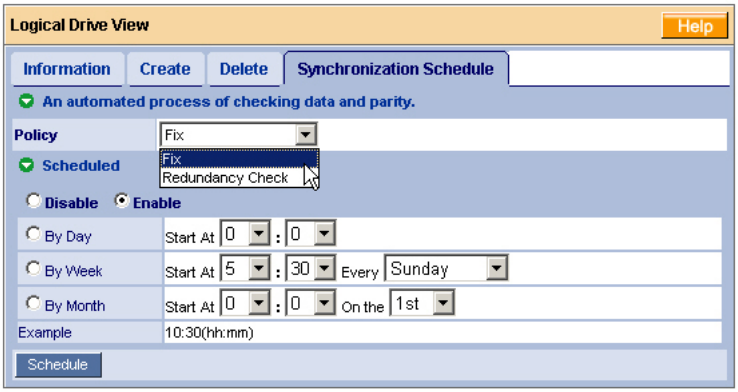
Synchronization refers to an automated process of checking and correcting data and parity. Unlike a Rebuild, Synchronization is a maintenance operation.

Redundancy Check is an automated process of checking data and parity but it only reports and does not correct, any inconsistencies that it finds.

Synchronization and Redundancy Check apply to RAID 1, 5, 6, 10 and 50 logical drives. When an logical drive is first created and you select Full Initialization, the same action as Synchronization takes place.

To schedule Synchronization for all logical drives:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Synchronization Schedule tab in Management View.



3. In the Policy dropdown menu, select *Fix* if you want Synchronization or *Redundancy Check* if you do not want to correct inconsistencies.
4. Click on the **Enable** radio button.
5. Click on the **by Day**, **by Week** or **by Month** radio button.
6. From the dropdown menus, select a start time and a day of the Week or Month, if applicable.

   Start time is based on a 24-hour clock.
7. Click the **Schedule** button.

If you want to cancel the scheduled Synchronization, do the following:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Synchronization tab in Management View.
3. Click on the **Disable** radio button.

Logical Drive Synchronization/Redundancy Check

Synchronization refers to an automated process of checking and correcting data and parity. Unlike a Rebuild, Synchronization is a maintenance operation. You can also synchronize all logical drives at the same time, see page 97.

Redundancy Check is an automated process of checking data and parity but it only reports and does not correct, any inconsistencies that it finds.

Synchronization and Redundancy Check apply to RAID 1, 5, 6, 10 and 50 logical drives. When an logical drive is first created and you select Full Initialization, the same action as Synchronization takes place.

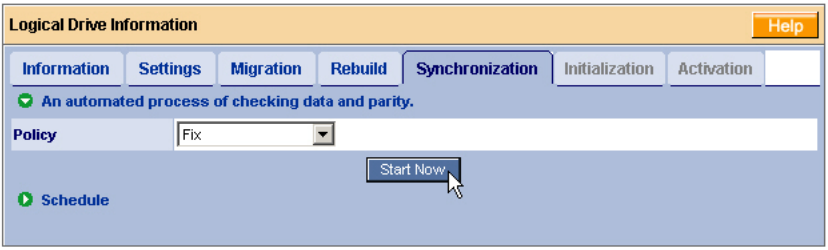
Promise recommends that you first Synchronize and then Redundancy Check all newly created logical drives where you selected Fast Initialization or None.

You can set up a Synchronization or Redundancy Check to begin immediately (on demand) or schedule a Synchronization or Redundancy Check for a time when there is less demand on the RAID system.

On Demand

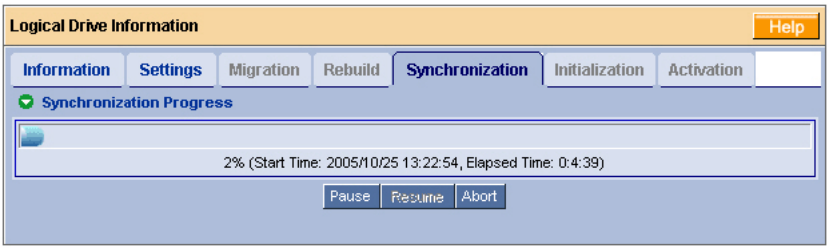
To Synchronize or Redundancy Check a logical drive:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon of the logical drive you want to synchronize.
3. Click on the Synchronization tab in Management View.



4. In the Policy dropdown menu, select *Fix* if you want Synchronization or *Redundancy Check* if you do not want to correct inconsistencies.

5. Click the **Start Now** button.

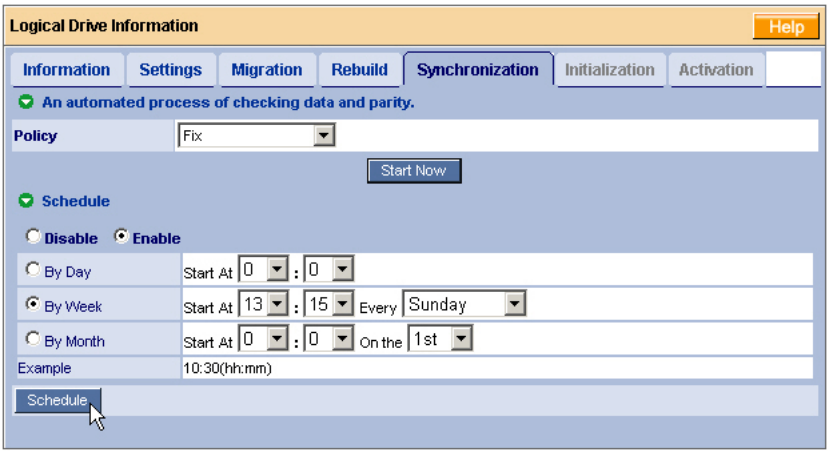


You can monitor Migration progress on the Logical Drive Migration tab. Click the respective buttons to pause, resume or abort the Synchronization or Redundancy Check.

Scheduled

To schedule a Synchronization or Redundancy Check:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon of the logical drive you want to synchronize.
3. Click on the Synchronization tab in Management View.



4. In the Policy dropdown menu, select *Fix* if you want Synchronization or *Redundancy Check* if you do not want to correct inconsistencies.
5. Click on the **Enable** radio button.
6. Click on the **by Day**, **by Week** or **by Month** radio button.

7. From the dropdown menus, select a start time and a day of the Week or Month, if applicable.

   Start time is based on a 24-hour clock.

8. Click the **Schedule** button.

Cancel a Schedule

If you want to cancel the scheduled Synchronization or Redundancy Check, do the following:

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon.
3. Click on the Synchronization tab in Management View.
4. Click on the **Disable** radio button.

Logical Drive Initialization

When logical drive is first created, you can select one of three choices for initialization:

- **Quick Initialization** – Erases the reserve and master boot sectors of the physical drives being added to the logical drive.
- **Full Initialization** – Erases all sectors of the physical drives being added to the logical drive.
- **None** – No initialization. This choice is not recommended.

When you select full initialization, the process takes some time, depending on the size of the physical drives selected for the logical drive. The Initialization tab enables you to pause the initialization process so that more of SuperTrak's resources are available for other operations. When the other operations are done, you can resume the initialization of your new logical drive.

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon of the logical drive whose initialization you want to pause.
3. Click on the Initialization tab in Management View.
4. Click the **Pause** button.

   The initialization process stops.

5. Click the **Resume** button.

   The initialization resumes from the point where you paused it.

Logical Drive Activation

This feature enables you to designate a hot plug-and-play logical drive. It will become available in a future release of the SuperTrak Controller card.

Logical Drive Critical / Offline

A fault-tolerant logical drive—RAID 1, 5, 10 or 50—goes *Critical* when a physical drive is removed or fails. A RAID 6 logical drive goes *Degraded* after one drive is removed or fails and *Critical* after two drives are removed or fail.

Due to the fault tolerance of the logical drive, the data is still available and online. However, once the logical drive goes critical, it has lost its fault tolerance and performance may be adversely affected.

If the fault was caused by a failed physical drive that was removed, the drive must be replaced by another drive, either identical or larger, in order for the RAID system to rebuild and restore optimal configuration.

A non-fault tolerant logical drive—RAID 0—goes offline when a physical drive is removed or fails. Since the logical drive is not fault tolerant, the data stored in the disk array is no longer accessible.

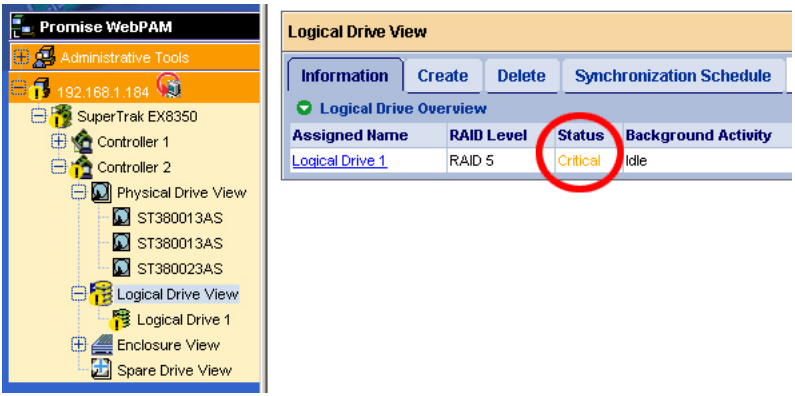
If one physical drive fails, all of the data on the logical drive is lost. You must replace the failed drive. Then, if the logical drive had more than one physical drive, delete the logical drive and re-create it. Restore the data from a backup source.

When a physical drive Fails

The following will occur when a physical drive fails or goes offline:

- The SuperTrak Controller's audible alarm, if enabled, will sound
- WebPAM reports the condition in Tree View, with popup messages and, if Event Notification is set up, email messages

- If you have a RAID 1, 5, 6, 10 or 50 logical drive with a hot spare drive properly configured, the logical drive will automatically rebuild itself using the spare drive



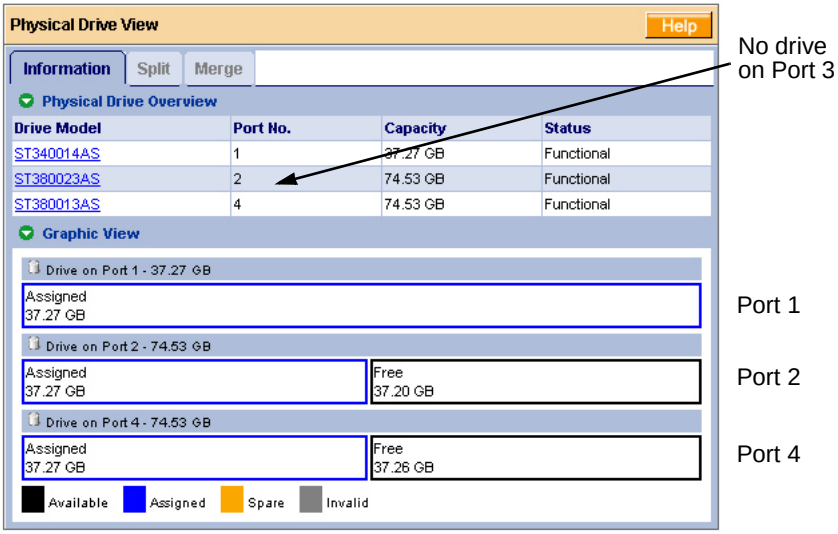
In the example above, amber **!** icons appear over the SuperTrak, Controller, Logical Drive View and Logical Drive icons. Click on the Logical Drive View or Logical Drive icons to verify the condition of the logical drive.

In this example, the Status is *Critical* and Background activity is *Idle*. This indicates that there is no automatic rebuild, so you must take action to restore the logical drive:

1. Identify the failed physical drive.
2. Replace the failed physical drive.
3. Rebuild your logical drive.

Identify the Failed physical drive

Click on the Physical Drive View icon in the WebPAM user interface. Look for a missing physical drive. A drive that used to be present but is suddenly absent is the failed physical drive.



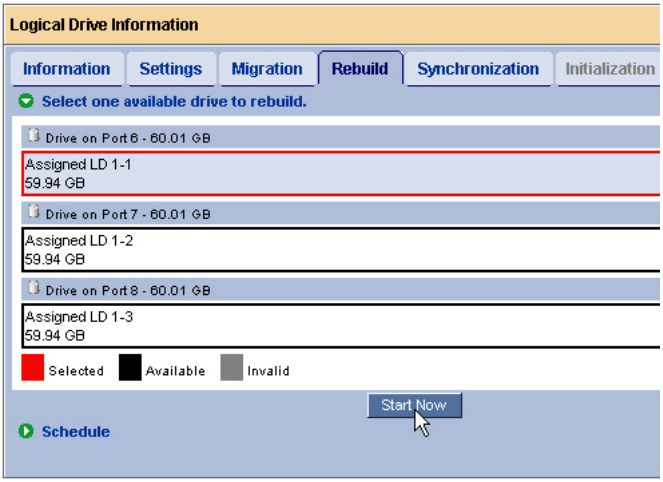
In this example, there were four physical drives connected to the SuperTrak Controller. Notice that there is no drive on Port 3. This is the failed drive.

Replace the Failed physical drive

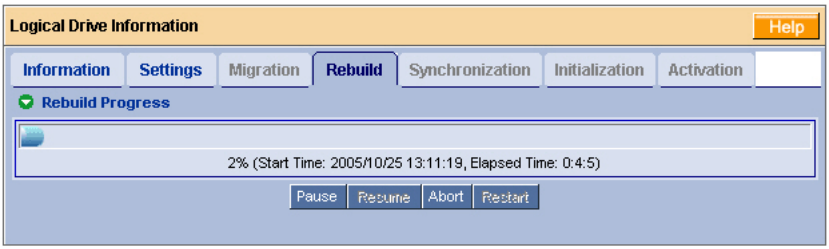
Replace the failed physical drive with a new one of equal or greater capacity. Then rebuild the logical drive. See “Installing the Physical Drives” on page 8 for more information about replacing a physical drive.

Rebuild Your Logical Drive

1. Click on the Logical Drive View icon in Tree View.
2. Click on the Logical Drive icon of the logical drive you want to rebuild.
3. Click on the Rebuild tab in Management View.



4. Select the physical drive you just replaced.
5. Click the **Start Now** button.



You can monitor Rebuild progress on the Logical Drive Rebuild tab. Click the respective buttons to pause and resume the Rebuild. When the Rebuild is finished, your logical drive will be Functional again.

Enclosures

This feature does not apply to SuperTrak EX16300/EX16350.

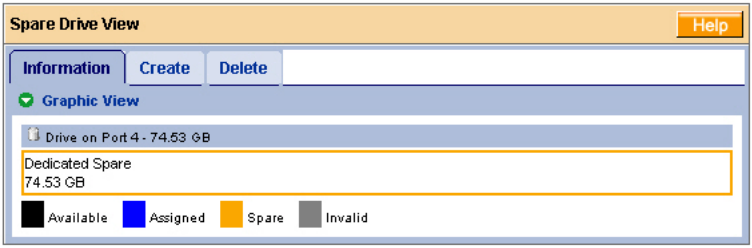
For more information, such as replacing physical drives and other repair operations, refer to the User Manual that came with your enclosure.

Spare Drives

A spare drive is a physical drive designated to function as a hot spare drive. A hot spare drive automatically replaces a failed physical drive. You can also set the Controller to rebuild a logical drive from a Free physical drive. See “Controller Settings” on page 65 and “Logical Drive Rebuild” on page 94 for more information on how spare drives work.

Spare Drive View

Spare Drive View provides a list of all spare drives currently on the Host PC. To access Spare Drive View, click on the Spare Drive View icon in Tree View.

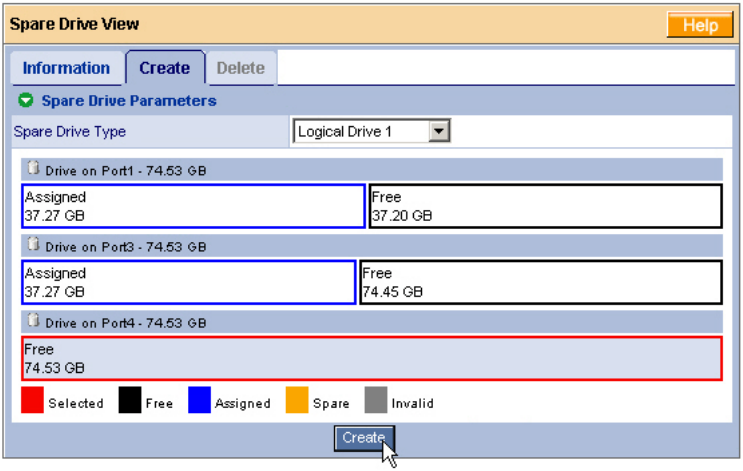


From this screen, you can view the current Spare Drives and click on the tabs to access the Create and Delete features.

Create a Spare Drive

To create a spare drive:

1. Click on the Logical Drive View icon.
2. Click on the Create tab.



3. From the Logical Drive dropdown menu, select
   - **Global Spare** – This Spare Drive can be used by any qualified Logical Drive.
   - **Logical Drive** – The name of the logical drive to which this Spare Drive will be assigned or dedicated.
4. Click on a physical drive to select it.

   Available drives have a black frame. Selected drives have a red frame. Drives with a blue frame are assigned to a logical drive.

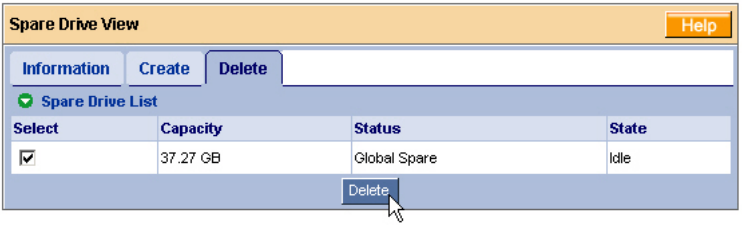
   You cannot assign a split drive as a spare drive.
5. Click the **Create** button.

The new Spare Drive appears under Physical Drive View and Spare Drive View.

Delete a Spare Drive

To delete a spare drive:

1. Click on the Logical Drive View icon.
2. Select the Delete tab.



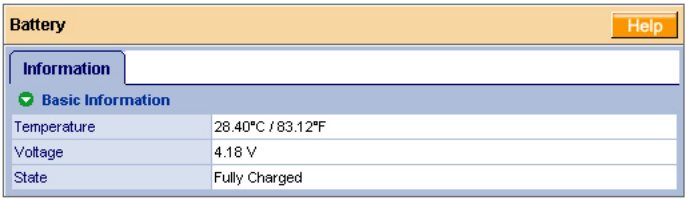
3. Check the box to the left of the spare drive you want to delete.
4. Click the **Delete** button.
5. In the Confirmation box, click the **OK** button.

The selected spare drive is deleted.

Battery

The Information tab displays information about the cache-backup battery, if one is installed on your SuperTrak controller.

To access the Controller–Information tab, click on the Battery icon in Tree View.



- **Temperature** – The battery's operating temperature.

  The battery normally has the same temperature as the inside of the PC where it is installed, typically below 38°C or 100°F.

  If the battery temperature rises above this value, determine whether the PC is overheating.

  If the PC is OK but the battery is too hot, the battery is not accepting a charge properly and you must replace it.

- **Voltage** – The battery supplies 3.3V to back up the controller cache in the event of a power failure. If battery voltage drops below this value, the battery is not accepting a charge properly and you must replace it.
- **State** – Under normal conditions, the battery shows Fully Charged. If the battery shows Charging or Discharging, it should return to Fully Charged within a few hours. If it does not show Fully Charged after 12 hours, replace the battery.

If the Battery icon does not appear in Tree View, the battery is either disconnected or was not installed.

For more information, see “Appendix C: Battery Backup Unit” on page 151.

Chapter 6: Technology Background

- Introduction to RAID (below)
- Choosing a RAID Level (page 119)
- JBOD – Single Drive (page 118)
- Choosing Stripe Block Size (page 122)
- Gigabyte Boundary (page 122)
- Initialization (page 122)
- Hot Spare Drive(s) (page 123)
- Partition and Format the Logical Drive (page 123)
- Cache Settings (page 124)
- Logical Drive Migration (page 124)

Introduction to RAID

RAID (Redundant Array of Independent Disks) allows multiple physical drives to be combined together in a logical drive. The operating system sees the logical drive as a single storage device, and treats it as such. The RAID software and/or controller handle all of the individual drives on its own. The benefits of a RAID can include:

- Higher data transfer rates for increased server performance
- Increased overall storage capacity for a single drive designation (such as, C, D, E, etc.)
- Data redundancy/fault tolerance for ensuring continuous system operation in the event of a hard drive failure

Different types of logical drives use different organizational models and have varying benefits. Also see “Choosing a RAID Level” on page 119. The following outline breaks down the properties for each type of RAID logical drive:

RAID 0 – Stripe

When a logical drive is striped, the read and write blocks of data are interleaved between the sectors of multiple physical drives. Performance is increased, since the workload is balanced between drives or “members” that form the logical drive. Identical drives are recommended for performance as well as data storage efficiency.

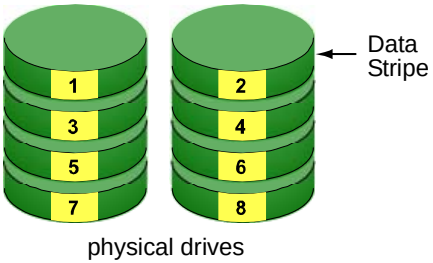


Figure 1. RAID 0 Striping interleaves data across multiple drives

The logical drive's data capacity equals the capacity of the smallest physical drive times the number of physical drives. For example, one 100GB and three 120GB drives will form a 400GB (4 x 100GB) logical drive instead of 460 GB.

If physical drives of different capacities are used, there will also be unused capacity on the larger drives.

RAID 0 logical drives on SuperTrak consist of one or more physical drives.

RAID 1 – Mirror

When a logical drive is mirrored, identical data is written to a pair of physical drives, while reads are performed in parallel. The reads are performed using elevator seek and load balancing techniques where the workload is distributed in the most efficient manner. Whichever drive is not busy and is positioned closer to the data will be accessed first.

With RAID 1, if one physical drive fails or has errors, the other mirrored physical drive continues to function. This is called Fault Tolerance. Moreover, if a spare physical drive is present, the spare drive will be used as the replacement drive and data will begin to be mirrored to it from the remaining good drive.

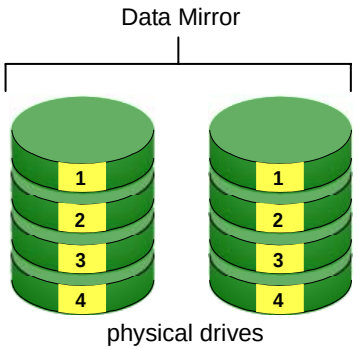


Figure 2. RAID 1 Mirrors identical data to two drives

The logical drive's data capacity equals the smaller physical drive. For example, a 100GB physical drive and a 120GB physical drive have a combined capacity of 100GB in a mirrored logical drive.

If physical drives of different capacities are used, there will also be unused capacity on the larger drive.

RAID 1 logical drives on SuperTrak consist of two physical drives.

If you want a mirrored logical drive with more than two physical drives, see “RAID 10 – Mirror / Stripe” on page 116.

RAID 5 – Block Striping with Distributed Parity

RAID 5 organizes block data and parity data across the physical drives. Generally, RAID Level 5 tends to exhibit lower random write performance due to the heavy workload of parity recalculation for each I/O. RAID 5 is generally considered to be the most versatile RAID level. It works well for file, database, application and web servers.

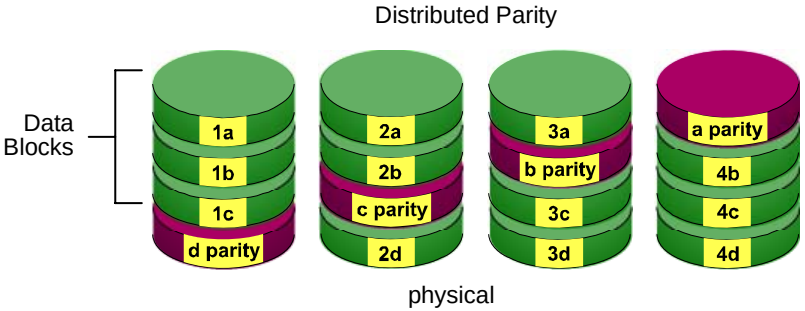


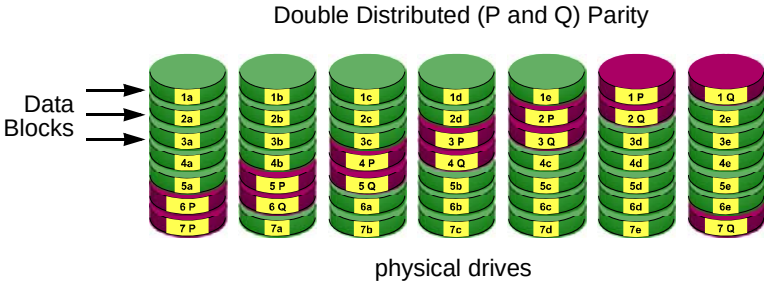
Figure 3. RAID 5 Stripes all drives with data and parity information

The capacity of a RAID 5 logical drive equals the smallest physical drive times the number of physical drives, minus one. Hence, a RAID 5 logical drive with four 100 GB physical drives will have a capacity of 300 GB. A logical drive with two 120 GB physical drives and one 100 GB physical drive will have a capacity of 200 GB.

RAID 5 requires a minimum of three physical drives.

RAID 6 – Block and Double Parity Stripe

RAID level 6 stores dual parity data is rotated across the physical drives along with the block data. A RAID 6 disk logical drive can continue to accept I/O requests when any two physical drives fail.



The total capacity of a RAID 6 disk logical drive is the smallest physical drive times the number of physical drives, minus two.

Hence, a RAID 6 disk logical drive with (7) 100 GB hard drives will have a capacity of 500 GB. A disk logical drive with (4) 100 GB hard drives will have a capacity of 200GB.

RAID 6 becomes more capacity efficient in terms of physical drives as the number of physical drives increases.

RAID 6 offers double fault tolerance. Your logical drive remains available when up to two physical drives fail.

RAID 6 is generally considered to be the safest RAID level.

RAID 6 requires a minimum of three physical drives.

RAID 10 – Mirror / Stripe

Mirror/Stripe combines both of the RAID 0 and RAID 1 logical drive types. It can increase performance by reading and writing data in parallel while protecting data with duplication. At least four physical drives are needed for RAID 10 to be installed. With a four-disk-drive logical drive, one drive pair is mirrored together then striped over a second drive pair.

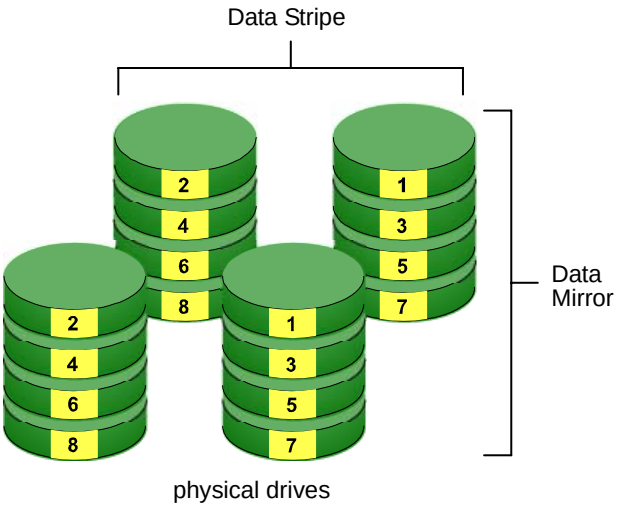


Figure 4. RAID 10 takes a data mirror on one drive pair and stripes it over two drive pairs

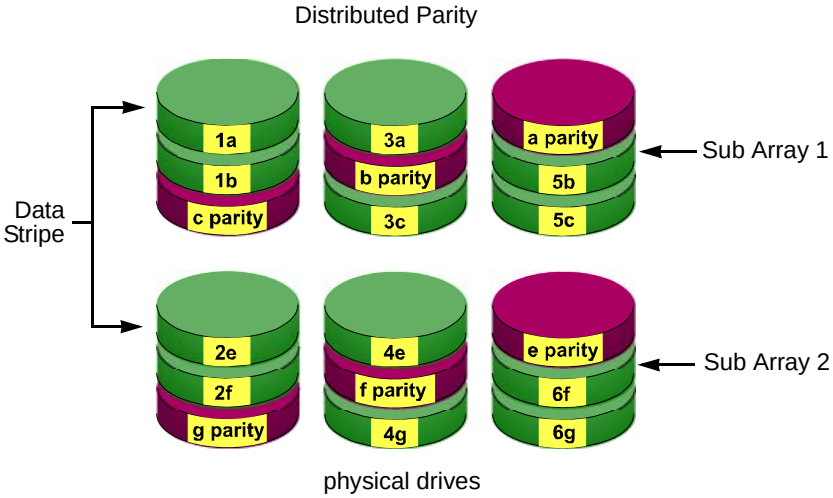
The data capacity RAID 10 logical drive equals the capacity of the smallest physical drive times the number of physical drives, divided by two.

In some cases, RAID 10 offers double fault tolerance, depending on which physical drives fail.

RAID 10 logical drives on SuperTrak consist of an even number of physical drives and a minimum of four.

RAID 50 – Striped Distributed Parity logical drives

RAID 50 combines both RAID 5 and RAID 0 features. Data is striped across disks as in RAID 0, and it uses distributed parity as in RAID 5. RAID 50 provides data reliability, good overall performance and supports larger volume sizes.



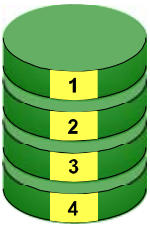
The data capacity RAID 50 logical drive equals the capacity of the smallest physical drive times the number of physical drives, minus two.

A RAID 50 logical drive is composed of two or more *Sub Arrays*, which are similar to RAID 5 logical drives. One physical drive in each sub array can fail but the RAID 50 logical drive will remain online. There must be at least three physical drives in a sub array. A sub array is also known as an *axle*.

RAID 50 logical drives on SuperTrak consist of even number of physical drives and a minimum of six.

JBOD – Single Drive

Just a Bunch of Disks (JBOD) arranges individual physical drives on the SuperTrak controller the same as if they were attached to the PC's motherboard controller. The advantage is that a SuperTrak Controller can accommodate up to four physical drives, more than most PC motherboards.



JBOD offers none of the performance or security advantages of a RAID logical drive. Any number of physical drives on the SuperTrak Controller can be designated as JBOD.

In WebPAM, JBOD is created, managed and deleted the same as a logical drive. You can also use the SuperTrak BIOS for this purpose. See the *SuperTrak User Manual* for more information on the BIOS.

In addition, if you attach a physical drive that was initialized using Windows disk management, that drive will be automatically recognized as a JBOD by the SuperTrak controller and WebPAM.

Choosing a RAID Level

There are several issues to consider when choosing the RAID Level for your logical drive. The following discussion summarizes some advantages, disadvantages and applications for each choice.

RAID 0

Advantages	Disadvantages
Implements a striped disk logical drive, the data is broken down into blocks and each block is written to a separate physical drive I/O performance is greatly improved by spreading the I/O load across many channels and drives No parity calculation overhead is involved	Not a true RAID because it is not fault-tolerant The failure of just one drive will result in all data in an logical drive being lost Should not be used in mission critical environments

Recommended Applications for RAID 0

- Image Editing
- Pre-Press Applications
- Any application requiring high bandwidth

RAID 1

Advantages	Disadvantages
Simplest RAID storage subsystem design Can increase read performance by processing data requests in parallel since the same data resides on two different drives	Very high disk overhead - uses only 50% of total capacity

Recommended Applications for RAID 1

- Accounting/Financial
- Payroll
- Any application requiring very high availability

RAID 5

Advantages	Disadvantages
High Read data transaction rate Medium Write data transaction rate Good aggregate transfer rate Most versatile RAID level	Disk failure has a medium impact on throughput

Recommended Applications for RAID 5

- File and Application servers
- WWW, E-mail, and News servers
- Intranet servers

RAID 6

Advantages	Disadvantages
High Read data transaction rate Medium Write data transaction rate Good aggregate transfer rate Safest RAID level	High disk overhead – equivalent of two drives used for parity Slightly lower performance than RAID 5

Recommended Applications for RAID 6

- Accounting/Financial
- Database servers
- Any application requiring very high availability

RAID 10

Advantages	Disadvantages
Implemented as a mirrored logical drive whose segments are RAID 0 logical drives High I/O rates are achieved thanks to multiple stripe segments	Very high disk overhead – uses only 50% of total capacity

Recommended Applications for RAID 10

- Imaging applications
- Database servers
- General fileserver

RAID 50

Advantages	Disadvantages
High Read data transaction rate Good write data transaction rate Very good aggregate transfer rate Most versatile RAID level	Disk failure has a moderate impact on throughput

Recommended Applications for RAID 50

- File and Application Servers
- Transaction Processing
- Office applications with many users accessing small files

JBOD

Advantages	Disadvantages
Easy management of multiple independent physical drives	No increase in performance, capacity or fault tolerance.

Recommended Applications for JBOD

- Non-critical file storage
- Swappable data storage

Choosing Stripe Block Size

The stripe block size value can be set to 32 KB, 64 KB and 128 KB.

64 KB is the default. This selection will directly affect performance. There are two issues to consider when selecting the stripe block size.

- Choose a stripe block size equal to or smaller than the smallest cache buffer found on any physical drive in your logical drive. A larger value slows the logical drive down because physical drives with smaller cache buffers need more time for multiple accesses to fill their buffers.
- If your data retrieval consists of fixed-size data blocks, such as some database and video applications, choose that data block size as your stripe block size.

Generally speaking, email, POS and webservers prefer smaller stripe block sizes. Video and database applications prefer larger stripe block sizes.

Gigabyte Boundary

The Gigabyte Boundary feature is designed for logical drives in which a drive has failed and the user cannot replace the drive with the same capacity or larger. Instead, the Gigabyte Boundary feature permits the installation of a replacement drive that is slightly smaller (within 1 gigabyte) than the remaining working drive (for example, an 80.5GB drive would be rounded down to 80GB). This can be helpful in the event that a drive fails and an exact replacement model is no longer available.

Initialization

Initialization is the process of setting all of the data bits on all of the physical drives to zero. This has the effect of erasing any existing data from the drives. This action is especially helpful in creating accurate parity in logical drives with more than four drives.

Initialization applies all RAID levels. It does not apply to JBOD. When you create one of these logical drives, you can specify Quick/Fast Initialization or Full Initialization. Full Initialization is recommended. See “Create a Logical Drive” on page 37 or page 77.

The Full Initialization process begins immediately after the logical drive is created and may take some time to finish, depending on the size of the physical drives in your logical drive. Your logical drive is available while initialization is in progress.

Hot Spare Drive(s)

A hot spare is a physical drive that is connected to the logical drive system but is not assigned as a member of the logical drive. In the event of the failure of a drive within a functioning fault tolerant logical drive, the hot spare is activated as a member of the logical drive to replace a drive that has failed.

SuperTrak will replace a failing physical drive in a logical drive with an unassigned drive, if one is available. The unassigned drive is not part of any logical drive. Such a drive is called a *hot spare* drive. There are two types:

- Global – An unassigned physical drive available to any logical drive on the Host PC.
- Dedicated – An unassigned physical drive that can only be used by a specified logical drive.

The hot spare policy function lets you select whether a logical drive will access any unassigned physical drive or a designated drive in the event of physical drive failure. See “Logical Drive Rebuild” on page 94 and “Create a Spare Drive” on page 106 for information.

The SuperBuild utility does not support hot spare drives.

The spare drive effectively takes the place of the failed drive and the RAID system immediately begins to rebuild data onto the drive. When the rebuild is complete, the logical drive is returned to fault tolerant status.

Maintaining a hot spare drive is a good precaution to protect your logical drive integrity in the event of drive failure.

Partition and Format the Logical Drive

Like any other type of fixed disk media in your system, a RAID logical drive must also be partitioned and formatted before use. Use the same method of partitioning and formatting on an logical drive as you would any other fixed disk.

See “Appendix A: Partition and Format” on page 139.

Cache Settings

There is a data cache on the SuperTrak controller and another one on each physical drive. A cache holds data in volatile memory during RAID management and data transfer activity. The right combination of cache settings for your needs can improve SuperTrak's efficiency and performance.

Physical Drive Write Cache – Activates the write cache on the physical drive.

Write Back Cache – Activates write-back feature of SuperTrak's controller cache. A write back cache holds data after an I/O operation and tells the controller the data has been written. The data is written as soon as the physical drive is no longer busy.

This action increases availability of the logical drive. If the power fails before the data is written to the physical drive, the data will be lost.

The alternative is a write-through cache policy, which reports that the data has been written to the disk only when it actually has.

To make Cache settings, see "Create a Logical Drive" on page 77 and "Logical Drive Settings" on page 90.

Logical Drive Migration

Migration is the process of:

- Changing the RAID level
- Adding physical drives but keeping the same RAID level

The Logical Drive–Migration tab enables you to migrate an existing logical drive. See "Logical Drive Migration" on page 90.

In the migration process, the existing logical drive is called the *Source*. The proposed logical drive is called the *Target*. Each target logical drive has certain requirements and they are different for each RAID level. You must meet all of the requirements in order to successfully migrate a logical drive.

In most cases, you must add one or more physical drives during the migration process. You can never reduce the number of physical drives.

Note that when you migrate a logical drive to RAID 6, you must compute the number of physical drives required based on:

- The number of physical drives in the source logical drive
- The parity count (2 or 3) you plan to select

The tables below shows the migration options for a source logical drive according to its RAID level. The available target RAID levels are shown with their requirements.

RAID 0

A RAID 0 source logical drive can migrate to the following target logical drives:

Target	Requirements
RAID 0	Add physical drives.
RAID 1	2 physical drives only. Only a 1-drive RAID 0 can migrate to RAID 1. Add 1 physical drive.
RAID 5	3 physical drives minimum. At least 1 more physical drive than the RAID 0 logical drive.
RAID 6	3 physical drives minimum. Number of physical drives is greater than or equal to the number of RAID 0 physical drives.
RAID 10	4 physical drives minimum. Even number of physical drives. At least 2 more physical drives than the RAID 0 logical drive.
RAID 50	6 physical drives minimum. Even number of physical drives. At least 2 more physical drives than the RAID 0 logical drive.

RAID 1

A RAID 1 Source logical drive can migrate to the following Target logical drives:

Target	Requirements
RAID 5	3 physical drives minimum. At least 1 more physical drive than the RAID 1 logical drive.
RAID 6	3 physical drives minimum. Number of physical drives is greater than or equal to 1 plus the parity count.
RAID 10	4 physical drives minimum. Even number of physical drives. At least 2 more physical drives than the RAID 1 logical drive.
RAID 50	6 physical drives minimum. Even number of physical drives.

RAID 5

A RAID 5 Source logical drive can migrate to the following Target logical drives:

Target	Requirements
RAID 5	Add physical drives.
RAID 6	Number of physical drives is greater than or equal to the number of RAID 5 physical drives, minus 1, plus the parity count.
RAID 50	6 physical drives minimum. If the RAID 5 array had an *odd* number of physical drives, add 1, 3, 5, 7, 9 or 11 physical drives. If the RAID 5 array had an *even* number of physical drives, add 2, 4, 6, 8, 10 or 12 physical drives.

RAID 6

A RAID 6 Source logical drive can migrate to the following Target logical drives:

Target	Requirements
RAID 6	Add physical drives.

RAID 10

A RAID 10 Source logical drive can migrate to the following Target logical drives:

Target	Requirements
RAID 5	Add physical drives.
RAID 6	Number of physical drives is greater than or equal to the number of RAID 10 physical drives divided by 2, plus the parity count.
RAID 10	Add physical drives. Even number of physical drives.
RAID 50	6 physical drives minimum. Even number of physical drives.

RAID 50

A RAID 50 Source logical drive can migrate to the following Target logical drives:

Target	Requirements
RAID 6	Number of physical drives is greater than or equal to the number of RAID 50 physical drives.
RAID 50	Add physical drives. Even number of physical drives.

Chapter 7: Support

- Frequently Asked Questions, below
- Contact Technical Support, page 133
- Limited Warranty, page 135
- Return Product for Repair, page 137

Frequently Asked Questions

This section lists frequently asked questions involving pre-installation, drive issues, installation, and post-installation.

Pre-Installation (Speed, Device Types, Capacity, Cabling)

What kind of HDDs can I use for a SuperTrak EX Series logical drive?

You can use any Serial ATA hard drive(s) to create arrays on the SuperTrak EX Series. Use matching drives for multiple-drive arrays to maximize capacity usage as well as performance.

What is the maximum physical drive storage capacity of SuperTrak EX Series?

The SuperTrak EX16300 and EX16350 support up to 6.4 TB (sixteen 400 GB physical drives).

Will ACPI work with HDDs on the SuperTrak EX Series?

Yes. The SuperTrak Controller supports ACPI S1, S3 and S4 standby modes. ACPI currently applies to the Windows OS only.

Can I use ATAPI devices on the SuperTrak EX Series?

No. The SuperTrak Controller does not support ATAPI devices.

What kind of PCI slot do I use for the SuperTrak EX Series?

SuperTrak EX16300 requires a PCI-X slot.

SuperTrak EX16350 will work in a PCI-Express X8 or X16 slot.

How can I change the resources that the SuperTrak uses?

The SuperTrak EX16300 and EX16350 are fully PnP. This means all the resources that it uses are given to it by the PnP BIOS on the motherboard.

The SuperTrak Controller supports IRQ sharing, but this feature only works when ALL the concerned devices support it. If your motherboard allows you to control the assignment of these resources, you may be able to remedy the problem by:

- Changing the IRQ assignments to the PCI slots in the motherboard BIOS during boot up.
- Reset the configuration data in your CMOS. This is usually an option in the PnP section of your CMOS.
- Otherwise, switch the SuperTrak Controller card to a different PCI slot.

Drive Issues

Can I add a drive to a SuperTrak EX Series logical drive via hot-swap and dynamically adjust the array size/configuration?

Yes. The SuperTrak Controller supports online logical drive expansion and migration. You must use the SuperBuild utility or the WebPAM software to expand or migrate an existing logical drive.

Do the HDDs on the SuperTrak EX Series have to be the same size?

The physical drives that you use with the SuperTrak EX Series do not have to be the same size. If the sizes differ, the SuperTrak Controller will truncate the large drive so the capacities match. The resulting difference in drive space is unusable, so avoid using physical drives of significantly different capacities.

Can I take a drive used in a SuperTrak EX Series logical drive and access it directly with a different controller, such as the one integrated on the motherboard?

Yes, but only under certain configurations. First, the other controller must address the drives as LBA, not CHS.

Second, only the following configurations allow the drive(s) to be accessed individually on another controller:

- Single-drive RAID 0 (stripe)
- One drive from a RAID 1 (mirror) logical drive
- JBOD

Other array configurations will not work for this purpose.

I already have an array on a Promise FastTrak controller. Can I move that array to my new SuperTrak EX Series controller?

Yes, if your HDDs are SATA. All SuperTrak controllers read the logical drives the same way, so the HDDs can be moved from an older controller to a newer one.

If I have a problem with one of the drives on the SuperTrak EX Series, how can I low-level format it to correct the problem?

Do NOT do this! Low-level formatting the physical drives is not only unnecessary but it generally does not correct problems commonly experienced during use, such as bad sectors or ECC/CRC.

Try running the disk drive manufacturer's diagnostic utility. The action typically requires you to connect the drive directly to the motherboard controller. If the utility cannot correct the problem, replace the disk drive.

Do I have to install disk management software on my logical drive in order to access the full storage capacity of drives?

No! Disk management software will only complicate things. The logical drive should be fully addressable by your OS as it is. Remember that some operating systems have varying limits on the sizes of partitions and logical drives that can be defined. Consult your OS documentation about partitioning larger drives.

What system BIOS setup settings do I use for the drives on the SuperTrak EX Series controller?

A BIOS setting is required only if you want to boot your system from the logical drive on the SuperTrak controller. After your logical drive is created, partitioned and formatted, make the change in your BIOS boot order setting.

How do I partition/format my SuperTrak EX Series RAID logical drive?

The SuperTrak Controller represents the logical drive as a single physical drive to your system. Therefore, anything that you can do to a single physical drive you can do to a SuperTrak logical drive.

For example, you can use the New Partition Wizard in Windows or the FDISK and MKFS functions in Linux to partition and format the logical drive. Run these functions directly from the OS or from the OS installation CDs. You can format the logical drive with any file system you wish.

Do not use the DOS FDISK utility, as it only supports logical drive smaller than 100 GB.

Installation Issues (Capacity, Booting)

How can I change the system boot sequence in order to boot from the SuperTrak EX Series logical drive?

The boot sequence is controlled by the system BIOS. As far as the system BIOS is concerned, the SuperTrak Controller and defined logical drives are categorized as a SCSI device. Look for SuperTrak LD1, LD2, and so on. In your BIOS setup utility, set the boot sequence to boot from SCSI first.

If there are multiple SCSI add-in controllers in the system, then the boot sequence among them will be determined exclusively by their PCI slot priority. PCI slot #1 will be first, slot #2 second, etc. Put the SuperTrak Controller in the PCI-Express or PCI-X slot where it will be accessed ahead of other SCSI controllers if you want to boot from the logical drive.

How can I change the boot sequence between a PCI SCSI card and the SuperTrak EX Series RAID logical drive?

Since all PCI-Express and PCI-X devices are PnP, it is difficult to determine which device is addressed first. Most motherboard BIOSes have advanced options that identify devices and allow you to select which device will be assigned resources first. Otherwise you may have to physically switch the device cards on the PCI/PCI-Express/PCI-X slots so that the boot device is in the highest priority slot number (see previous question).

Post-Installation

Why can't I see the drives on the SuperTrak EX Series under FDISK?

You have not created a logical drive yet. Without a logical drive, the system will not recognize the physical drives attached to the SuperTrak Controller.

A physical drive is recognized by the SuperTrak controller but not available to use in a logical drive. How can I make it available?

Open the SuperBuild utility and access Physical Drive Management. Highlight the drive, then press the Alt and F1 keys at the same time. This action clears the reserve sector in order to make the drive available.

Why can't I make a dedicated spare drive in WebPAM?

Early versions of Internet Explorer running in Windows 2000 exhibit this problem. Update your Internet Explorer to the latest version.

Why can't I run WebPAM in Konqueror?

The Konqueror browser (Linux) does not support WebPAM. Install a Netscape Navigator, Mozilla or Firefox browser. With that browser as the default, reinstall WebPAM.

Aren't the WebPAM icons supposed to be animated?

Yes, they are animated. However, the default setting for Internet Explorer under Windows 2003 Server does not display animation in the browser. Go to Internet Options > Advanced and check Play animations in web pages.

Contact Technical Support

Promise Technical Support provides several support options for Promise users to access information and updates. We encourage you to use one of our electronic services, which provide product information updates for the most efficient service and support.

If you decide to contact us, please have the following information available:

- Product model and serial number
- BIOS and driver version numbers
- A description of the problem / situation
- System configuration information, including: motherboard and CPU type, hard drive model(s), SATA/ATA/ATAPI drives & devices, and other controllers.

Technical Support Services

Promise Online™ Web Site	http://www.promise.com/support (technical documents, drivers, utilities, etc.)

United States

E-mail Support	support@promise.com
Fax Technical Support	(408) 228-1097 Attn: Technical Support
Phone Technical Support	(408) 228-1400 option 4
If you wish to write us for support:	Promise Technology, Inc. Attn: Technical Support 580 Cottonwood Drive Milpitas, CA 95035, USA

Europe, Africa, Middle East

E-mail Support	support@promise-emea.com
Fax Technical Support	+31 (0) 40 256 9463 Attn: Technical Support
Phone Technical Support	+31 (0) 40 235 2600
If you wish to write us for support:	Promise Technology Europe B.V. Attn: Technical Support Science Park Eindhoven 5542 5692 EL Son, The Netherlands

Germany

E-mail Support	support-de@promise-emea.com
Fax Technical Support	+49 (0) 2 31 56 76 48 - 29 Attn: Technical Support
Phone Technical Support	+49 (0) 2 31 56 76 48 - 10
If you wish to write us for support:	Promise Technology Germany Attn: Technical Support Europaplatz 9 44269 Dortmund, Germany

Italy

E-mail Support	support-it@promise-emea.com
Fax Technical Support	0039 06 367 12400 Attn: Technical Support
Phone Technical Support	0039 06 367 12626
If you wish to write us for support:	Promise Technology Italy Attn: Technical Support Piazza del Popolo 18 00187 Roma, Italy

Taiwan

E-mail Support	support@promise.com.tw
Fax Technical Support	+886 3 578 2390 Attn: Technical Support
Phone Technical Support	+886 3 578 2395 (ext. 8811)
If you wish to write us for support:	Promise Technology, Inc. Attn: Technical Support 2F, No. 30, Industry E. Rd. IX Science-based Industrial Park Hsinchu, Taiwan, R.O.C.

China

E-mail Support	support-china@promise.com
Fax Technical Support	+86-10-8857-8015 Attn: Technical Support
Phone Technical Support	+86-10-8857-8085/8095
If you wish to write us for support:	Promise Technology China Attn: Technical Support Room 1205, Tower 3 Webok Time Center, No.17 South Zhong Guan Cun Street Hai Dian District, Beijing 100081, China

Limited Warranty

Promise Technology, Inc. (“Promise”) warrants that for three (3) years from the time of the delivery of the product to the original end user:

a) the product will conform to Promise’s specifications;

b) the product will be free from defects in material and workmanship under normal use and service.

This warranty:

a) applies only to products which are new and in cartons on the date of purchase;

b) is not transferable;

c) is valid only when accompanied by a copy of the original purchase invoice.

d) Is not valid on spare parts, fans, and power supplies

This warranty shall not apply to defects resulting from:

a) improper or inadequate maintenance, or unauthorized modification(s), performed by the end user;

b) operation outside the environmental specifications for the product;

c) accident, misuse, negligence, misapplication, abuse, natural or personal disaster, or maintenance by anyone other than a Promise or a Promise-authorized service center.

Disclaimer of other warranties

This warranty covers only parts and labor, and excludes coverage on software items as expressly set above.

Except as expressly set forth above, Promise DISCLAIMS any warranties, expressed or implied, by statute or otherwise, regarding the product, including, without limitation, any warranties for fitness for any purpose, quality, merchantability, non-infringement, or otherwise. Promise makes no warranty or representation concerning the suitability of any product for use with any other item. You assume full responsibility for selecting products and for ensuring that the products selected are compatible and appropriate for use with other goods with which they will be used.

Promise DOES NOT WARRANT that any product is free from errors or that it will interface without problems with your computer system. It is your responsibility to back up or otherwise save important data before installing any product and continue to back up your important data regularly.

No other document, statement or representation may be relied on to vary the terms of this limited warranty.

Promise's sole responsibility with respect to any product is to do one of the following:

a) replace the product with a conforming unit of the same or superior product;

b) repair the product.

Promise shall not be liable for the cost of procuring substitute goods, services, lost profits, unrealized savings, equipment damage, costs of recovering, reprogramming, or reproducing of programs or data stored in or used with the products, or for any other general, special, consequential, indirect, incidental, or punitive damages, whether in contract, tort, or otherwise, notwithstanding the failure of the essential purpose of the foregoing remedy and regardless of whether Promise has been advised of the possibility of such damages. Promise

is not an insurer. If you desire insurance against such damage, you must obtain insurance from another party.

Some states do not allow the exclusion or limitation of incidental or consequential damages for consumer products, so the above limitation may not apply to you.

This warranty gives specific legal rights, and you may also have other rights that vary from state to state. This limited warranty is governed by the State of California.

Your Responsibilities

You are responsible for determining whether the product is appropriate for your use and will interface with your equipment without malfunction or damage. You are also responsible for backing up your data before installing any product and for regularly backing up your data after installing the product. Promise is not liable for any damage to equipment or data loss resulting from the use of any product.

Return Product For Repair

If you suspect a product is not working properly, or if you have any questions about your product, contact our Technical Support Staff through one of our Technical Services, making sure to provide the following information:

- Product model and serial number (required)
- Return shipping address
- Daytime phone number
- Description of the problem
- Copy of the original purchase invoice

The technician will assist you in determining whether the product requires repair. If the product needs repair, the Technical Support Department will issue an RMA (Return Merchandise Authorization) number.

Important

Obtain an RMA number from Technical Support *before* you return the product and write the RMA number on the label. The RMA number is essential for tracking your product and providing the proper service.

Return ONLY the specific product covered by the warranty (do not ship cables, manuals, diskettes, etc.), with a copy of your proof of purchase to:

USA and Canada:	Promise Technology, Inc. Customer Service Dept. Attn.: RMA # _____ 47654 Kato Road Fremont, CA 94538
Other Countries:	Return the product to your dealer or retailer. Contact them for instructions before shipping the product.

You must follow the packaging guidelines for returning products:

- Use the original shipping carton and packaging
- Include a summary of the product's problem(s)
- Write an attention line on the box with the RMA number
- Include a copy of proof of purchase

You are responsible for the cost of insurance and shipment of the product to Promise. Note that damage incurred due to improper transport or packaging is not covered under the Limited Warranty.

When repairing returned product(s), Promise may replace defective parts with new or reconditioned parts, or replace the entire unit with a new or reconditioned unit. In the event of a replacement, the replacement unit will be under warranty for the remainder of the original warranty term from purchase date, or 30 days, whichever is longer.

Promise will pay for standard return shipping charges only. You will be required to pay for any additional shipping options (such as express shipping).

Appendix A: Partition and Format

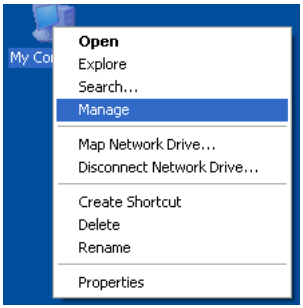
In order for your operating system to recognize and work with the physical drives attached to your SuperTrak RAID Controller card, the drives must be partitioned and formatted.

- If your drives were previously partitioned and formatted they are ready to use and you can skip this procedure
- If your drives have not been partitioned and formatted, you must do that job before you can use them

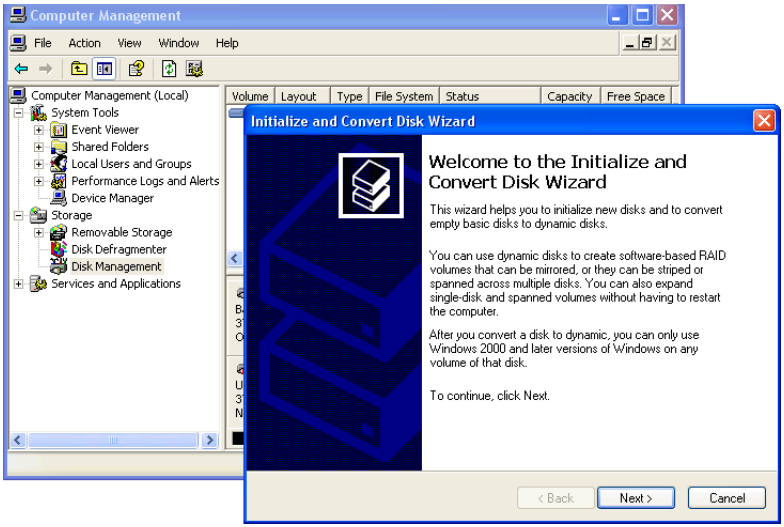
The actions of partitioning and formatting create a file structure on the physical drives with which your operating system can work. In the example below, we show how this is done in Windows. A similar procedure is required for Linux PC's. However, partitioning and formatting in Linux is not automated, therefore please refer to your system documentation for the exact procedure.

Note

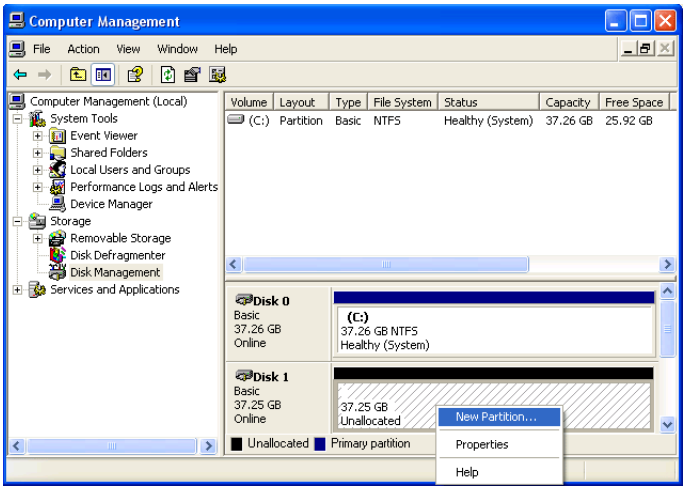
If you plan to boot your computer from this logical disk, go to Windows and Device Driver Installation under the Installation section for instructions. The instructions here are for data logical disks only.



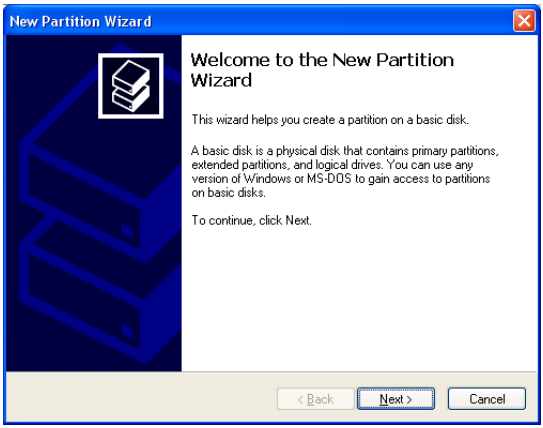
1. From the desktop, right-click on the My Computer icon and select *Manage* from the popup menu. The Computer Management window opens.
2. From the left menu, click on Disk Management. The Disk Management window opens with your new logical disk identified as Disk 1. The Initialize Wizard appears automatically.


Computer Management
File Action View Window Help
Computer Management (Local)
System Tools
Event Viewer
Shared Folders
Local Users and Groups
Performance Logs and Alerts
Device Manager
Storage
Removable Storage
Disk Defragmenter
Disk Management
Services and Applications
Volume Layout Type File System Status Capacity Free Space
Initialize and Convert Disk Wizard
Welcome to the Initialize and Convert Disk Wizard
This wizard helps you to initialize new disks and to convert empty basic disks to dynamic disks.
You can use dynamic disks to create software-based RAID volumes that can be mirrored, or they can be striped or spanned across multiple disks. You can also expand single-disk and spanned volumes without having to restart the computer.
After you convert a disk to dynamic, you can only use Windows 2000 and later versions of Windows on any volume of that disk.
To continue, click Next.
< Back
Next >
Cancel

3. Click the **Next** button to start the Wizard.
4. In the following windows, select Disk 1 to Initialize. Do not select any disks to Convert. Click the **Finish** button to Initialize the logical disk.

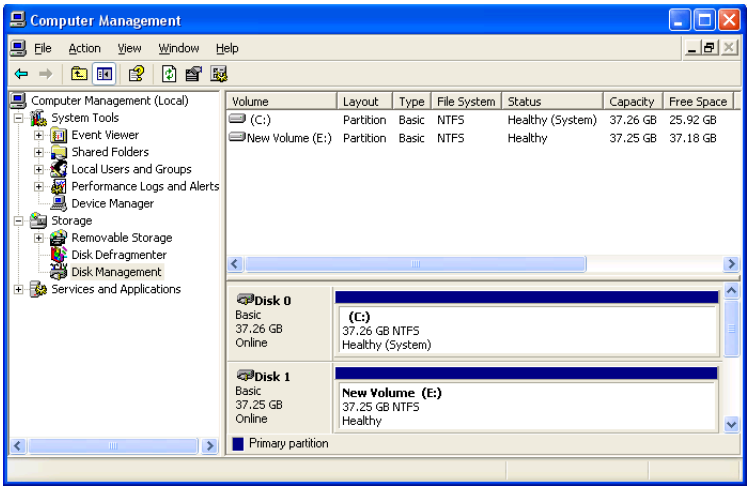


5. Right-click on the Unallocated portion of Disk 1 and select *New Partition...* from the popup menu. The New Partition Wizard appears.

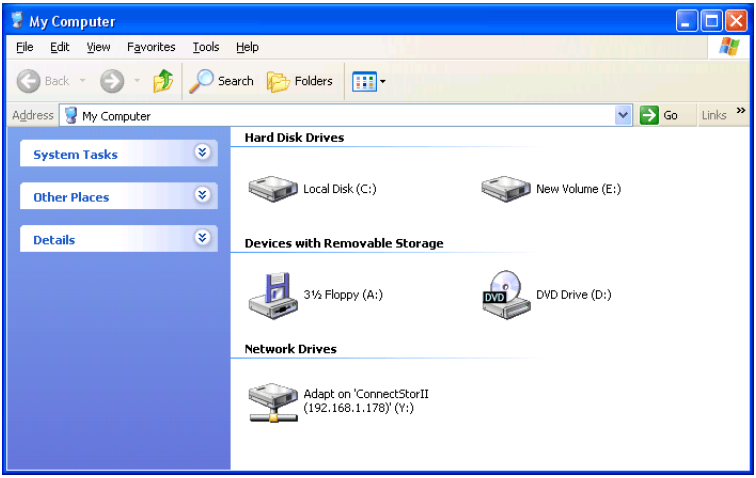

New Partition Wizard
Welcome to the New Partition Wizard
This wizard helps you create a partition on a basic disk.
A basic disk is a physical disk that contains primary partitions, extended partitions, and logical drives. You can use any version of Windows or MS-DOS to gain access to partitions on basic disks.
To continue, click Next.
< Back
Next >
Cancel

6. Click the **Next** button to start the wizard.
7. In the following windows, do the following actions. Click **Next** to move to the next window.
   - Select Primary Partition
   - Specify the maximum available partition size in MB
   - Assign the available drive letter of your choice
   - Choose Format this partition with the following settings
   - File system: NTFS
   - Allocation unit size: Default
   - Volume label: Enter your choice of name
   - Do not check “Perform a quick format” or “Enable file and folder compression”
8. Review your selections and click **Finish**. The New Partition Wizard will disappear while partitioning and formatting begin.

   This process will take some time. The Disk Management window displays the progress.



When formatting is complete, your logical disk will appear as a hard drive in the Disk Management window (above) and the My Computer window (below).



Appendix B: Upgrades

- BIOS and Firmware Upgrade (page 143)
- Software Driver Upgrade (page 145)
- WebPAM Upgrade (page 148)

BIOS and Firmware Upgrade

Follow this procedure to upgrade the BIOS and Firmware on your SuperTrak EX16300 or EX16350 Controller card.

The SuperTrak card must be properly installed in your PC or server in order to perform the upgrade. See “Install the SuperTrak EX16300 Card” on page 6 or “Install the SuperTrak EX16350 Card” on page 7 for more information.

Step 1: Preparation

You need two diskettes to perform the BIOS and Firmware upgrade procedure:

- A DOS-bootable diskette
- A blank, formatted diskette for the upgrade file

Step 2: Download BIOS and Firmware File

1. Go to the Promise website www.promise.com/support.
2. Click on *Downloads*.
3. Click on the Select Product popup menu and choose *SuperTrak EX16300* or *SuperTrak EX16350*.
4. Click on the Select Category popup menu and choose *BIOS*.
5. Click the **GO** button.

   The list of current BIOS options displays. Be sure you select the appropriate BIOS for your system.
6. Click on BIOS you want.
7. In the File Download dialog box, click the **Save** button.
8. In the Save As dialog box, direct the file to save to a convenient location on your PC.
9. Unzip the file and copy the contents to one of the blank, formatted floppy diskettes.
10. Label this diskette *SuperTrak Upgrade*.

    Use the upgrade diskette to install the BIOS and firmware upgrade package to the SuperTrak controller. Go to step 3, below.

Step 3: Install the BIOS and Firmware Package

Cautions

- Before you begin, backup any important or useful data.
- Do NOT skip any steps in the procedure.
- Do NOT power off your PC during the procedure.

1. Boot your PC from the DOS-bootable diskette.
2. When the A:\> prompt appears, remove the DOS-bootable diskette and insert the SuperTrak Upgrade diskette.
3. Type **step1** and press Enter.
4. When the A:\> prompt appears, remove the upgrade diskette and insert the DOS-bootable diskette.
5. Reboot your PC from the DOS-bootable diskette.
6. When the A:\> prompt appears, remove the DOS-bootable diskette and insert the SuperTrak Upgrade diskette.
7. Type **step2** and press Enter.
8. When the A:\> prompt appears, remove the SuperTrak Upgrade diskette.
9. Reboot your PC normally.

   This completes BIOS and Firmware upgrade procedure.

Software Driver Upgrade

Follow this procedure to upgrade the SuperTrak software drivers on your PC or server.

Step 1: Preparation

You need one blank, formatted diskette to perform this procedure.

Step 2: Download Driver Files

1. Go to the Promise website www.promise.com/support.
2. Click on *Downloads*.
3. Click on the Select Product popup menu and choose *SuperTrak EX16300* or *SuperTrak EX16350*.
4. Click on the Select Category popup menu and choose *Driver*.
5. Click the **GO** button.

   The list of current drivers displays. Promise provides 32-bit and 64-bit versions of its drivers. Be sure you select the appropriate driver for your system.
6. Click on the driver you want.
7. In the File Download dialog box, click the **Save** button.
8. In the Save As dialog box, direct the driver to save to a convenient location on your PC.
9. Copy the files to one of the blank, formatted floppy diskettes.

   For Windows driver files: Unzip the downloaded driver package and copy the files to the diskette.

   For Linux driver files:

   - On a Windows PC, run the rawrite.exe utility and extract the image file to the diskette.
   - On a Linux PC, run the command **dd if=imagefilename of=floppydevicename bs=10k** to copy the image file to the diskette.

     imagefilename = the disk image file name

     floppydevice name = the device name, such as /dev/fd0.
10. Label the diskette *SuperTrak Driver*.

    Use the SuperTrak Driver diskette to upgrade to the latest software driver. Go to step 3, below.

Step 3: Install the Software Drivers

Windows Server 2003, XP and 2000

1. Insert the SuperTrak Driver diskette in the A: drive.
2. In the Start Menu, go to Settings > Control Panel. Double-click on the System icon. Click on the Hardware tab. Click on the **Device Manager** button.
3. At the Device Manager, click on the "+" icon to the left of SCSI and RAID Controllers to expand the list.
4. Right-click on *Promise SuperTrak EX8350/EX16350/EX8300/EX16300 (tm) Controller* and select *Update Driver...*
5. In the Hardware Update Wizard, select *No, not this time* and click *Next*.
6. In the Hardware Update Wizard, select *Install from a list or specific location (Advanced)* and click *Next*.
7. Under Please choose your search and installation options, select *Don't search. I will choose the driver to install* and click *Next.*
8. Under Select the device driver you want to install, click *Have Disk...*
9. Under Install from Disk, type **A:** and click *OK.*
10. Under Select the device driver you want to install, click *Next*.

    If a warning about Digital Signature appears, click *Continue Anyway.*
11. Under Completing the Hardware Update Wizard, click *Finish*.
12. Click *Yes* to restart your PC.
13. Remove the SuperTrak Driver diskette.

Red Hat Enterprise Linux 4.0

1. Insert SuperTrak Driver diskette into the floppy drive.
2. Log in as *root*.
3. Run **mount -r /dev/fd0 /media/floppy**.
4. Run **cd /media/floppy**.
5. Run **sh ./install**.
6. When the Installer asks, *You are installing a driver on an existing OS. Is it true (y/n)?*, type **Y** and press Enter.
7. Run **cd; umount /media/floppy**.
8. Remove the SuperTrak Driver diskette.
9. Run **reboot** to restart the system.

SuSE Linux ES 9.0

1. Insert SuperTrak Driver diskette into the floppy drive.
2. Log in as *root*.
3. Run **mount /dev/fd0 /media/floppy**.
4. Run **cd /media/floppy**.
5. Run **./install**.
6. Run **cd; umount /media/floppy**.
7. Remove the SuperTrak Driver diskette.
8. Run **reboot** to restart the system.

WebPAM Upgrade

Follow this procedure to upgrade the WebPAM Software on your PC or server.

Step 1: Download the WebPAM File

1. Go to the Promise website www.promise.com/support.
2. Click on *Downloads*.
3. Click on the Select Product popup menu and choose *SuperTrak EX16300* or *SuperTrak EX16350*.
4. Click on the Select Category popup menu and choose *Utility*.
5. Click the **GO** button.

   The list of the current WebPAM software displays. Promise provides versions of WebPAM software for Windows and Linux. Be sure you select the appropriate version for your system.
6. Click on the WebPAM you want.
7. In the File Download dialog box, click the **Save** button.
8. In the Save As dialog box, direct the software to save to a convenient location on your PC.
9. Unzip the downloaded WebPAM package.

   The result is a single installer file. Go to step 2, below.

Step 2: Install WebPAM

You can install the latest version of WebPAM over an existing installation. The installer will delete the previous version and then install the new one.

Windows

Follow these steps to install WebPAM on your Windows-based PC or Server.

1. Boot up the PC/server and launch Windows.

   If the computer is already running, exit all programs.
2. Double-click on the WebPAM Installer file to launch it (right)

   The first WebPAM installation dialog box appears.

3. Follow the prompts in the installation dialog box.

Linux

Follow these steps to install WebPAM on your Linux-based PC or Server.

1. Boot up the PC/server and launch the Linux GUI.

   If the computer is already running, exit all programs.

2. Double-click on the WebPAM Installer file to launch it (right).

3. When the Run or Display? dialog box appears, click *Run in Terminal*.

   After several moments, the Terminal window closes and the first WebPAM installation dialog box appears.

4. Follow the prompts in the installation dialog box.

Step 3: Log-in to WebPAM

Double-click on the WebPAM icon on your Windows desktop (right). Or,

1. Launch your Browser.
2. In the Browser address field, type in the IP address of the Host PC, as explained below.

   If you did *not* choose the External Security option during WebPAM installation, use the *Regular* connection.

   If you chose the External Security option during WebPAM installation, use the *Secure* connection.

Regular Connection

- WebPAM uses an HTTP connection . . . . . .http://
- Enter the Host PC's IP address . . . . . .127.0.0.1 or localhost
- Enter the Port number . . . . . :8080
- Add to launch WebPAM . . . . . /promise

Together, your entry looks like this:

http://127.0.0.1:8080/promise or **http://localhost:8080/promise**

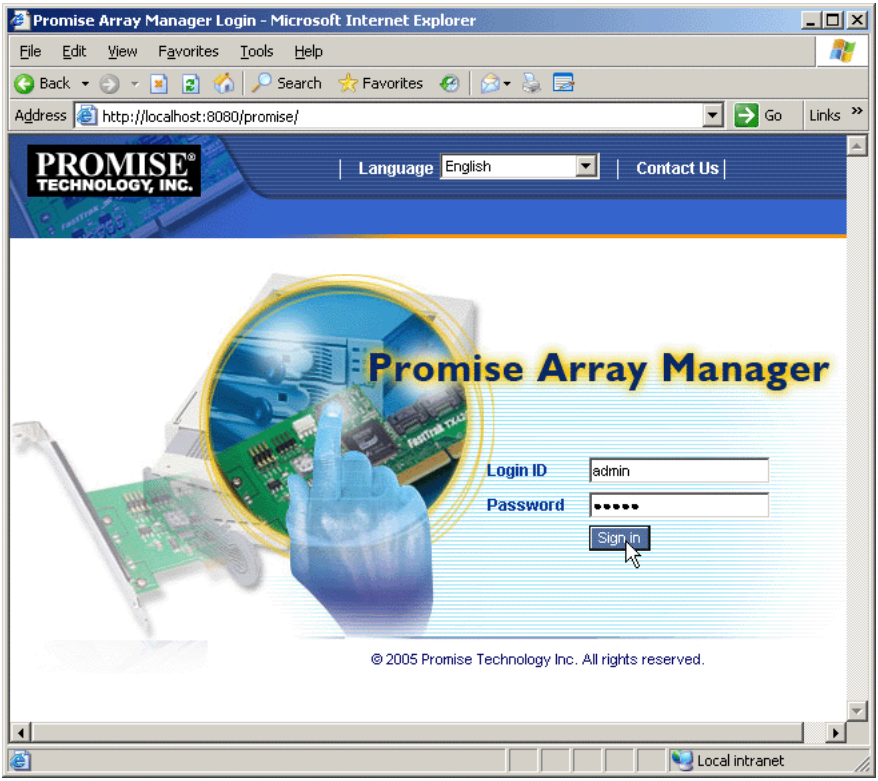
Secure Connection

- WebPAM uses a secure HTTP connection . . . . . .https://
- Enter the Host PC's IP address . . . . . .127.0.0.1 or localhost
- Enter the Port number . . . . . :8443
- Add to launch WebPAM . . . . . /promise

Together, your entry looks like this:

https://127.0.0.1:8443/promise or **https://localhost:8443/promise**

Note that the IP address shown above applies to a log-in at the Host PC. When you log in over a network, you will enter the Host PC's actual IP address.



When the opening screen (above) appears:

1. Type **admin** in the Login ID field.
2. Type **admin** in the Password field.
3. Click the **Sign in** button.

This is the default login for the Administrator. Each user will have their own Login ID (the User ID) and password. See "Add a User" on page 53 and "Change a User's Password" on page 57 for more information.

The Login ID and Password are case sensitive.

Appendix C: Battery Backup Unit

- Purpose (below)
- Installation (page 152)

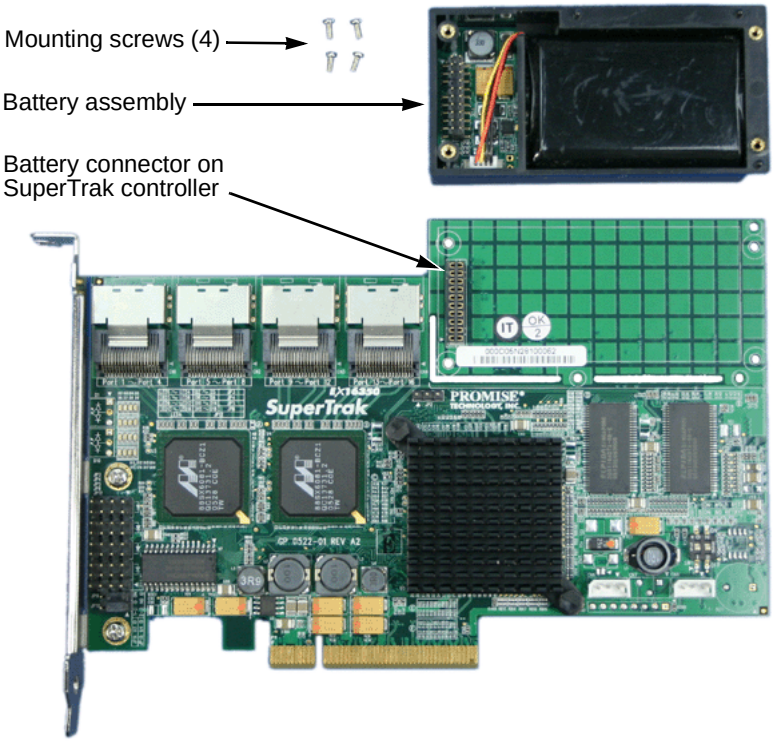
Purpose

The Battery Backup Unit (BBU) is a device that maintains power to the controller cache when a failure occurs in the power supply to the Host PC. The failure could be due to a problem with the PC's power supply, a cessation of electrical service or an accidental disconnection of the power cable.

When power is interrupted, any data in the controller's cache is lost. The BBU maintains power to the cache so that any data stored there is saved until it can be written to a physical drive.

Promise provides a BBU installation kit that fits all SuperTrak Serial ATA RAID controllers.

Installation



The BBU installation kit includes parts to fit all SuperTrak Serial ATA RAID controllers. For the SuperTrak EX16300 and EX16350, the following parts are required:

- Battery assembly, including a lithium battery and holder
- Mounting screws (4)

These items from the kit are not used on SuperTrak EX16300 and EX16350:

- Extension card (fits into a PCI slot)
- 20-pin cable

SuperTrak Controller Already Installed

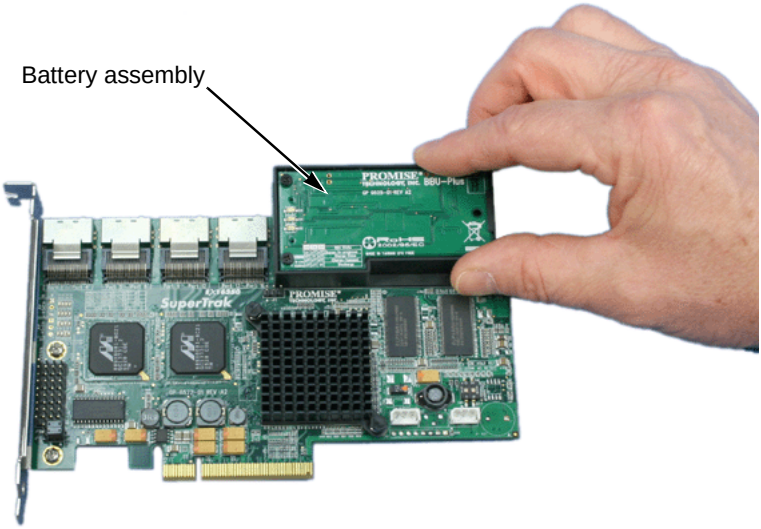
If your SuperTrak controller is already installed in the Host PC:

1. Power down the PC.
2. Disconnect the data and SMBus cables from the SuperTrak controller.
3. Remove the SuperTrak controller from the Host PC.

Install the BBU

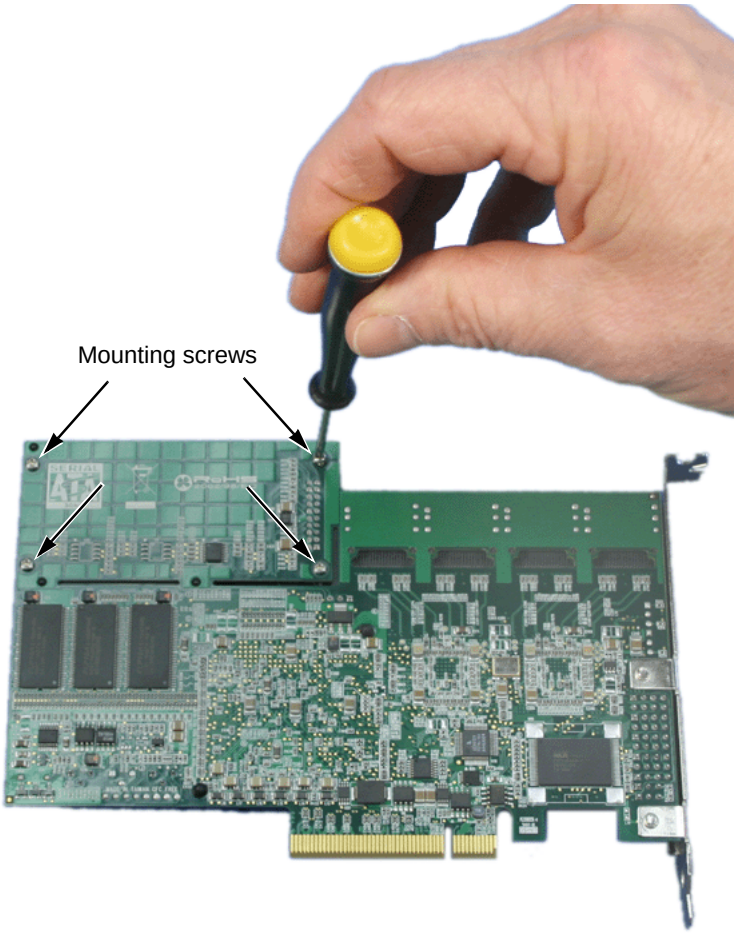
To install the BBU onto the SuperTrak controller:

1. Place the SuperTrak controller on an anti-static surface.



2. Place the battery assembly onto the SuperTrak controller so the 20-pin connectors on the battery and SuperTrak card line up.
3. Carefully pick up the SuperTrak card and turn it over.

   Hold the battery assembly against the SuperTrak card so the two do not separate.



4. Install the four mounting screws and snug them gently.
5. Install the SuperTrak controller into the Host PC.

   See “Chapter 2: Installation” on page 5 for more information.

After installation and power-up, a new battery takes several hours to charge. From that time, it should show Fully Charged. See “Battery” on page 108.

After you install the BBU, go to the SuperTrak controller settings and enable the Battery Not Detected Event. This feature enables the controller to check for the battery. See “Controller Settings” on page 65.